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REPORT ON THE APPLICATIONS OF TRANS-CANADA PIPE LINES LIMITED AND ALBERTA AND SOUTHERN GAS CO. LTD. UNDER THE GAS RESOURCES PRESERVATION ACT, 1956

OCTOBER 1967

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OIL AND GAS CONSERVATION BOARD
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I INTRODUCTION

This report deals with applications to the Oil and Gas Conservation Board under The Gas Resources Preservation Act, 1956, of Trans-Canada Pipe Lines Limited (hereinafter called "Trans-Canada") and Alberta and Southern Gas Co. Ltd. (hereinafter called "Alberta and Southern"). The former application was heard by the Board on June 6 to June 9, 1967, and the latter application on June 9, 1967.

One hearing followed the other and during the hearings it was agreed that the evidence of interveners would apply to both applications. Consideration of the Trans-Canada application necessitated a full review of the Province's gas reserves as of a later date than the Board's 1966 year-end estimates. The Alberta and Southern application also hinged largely on the reserves in fields named in its permit. In these circumstances, the Board decided to deal with the two applications in this one report.

Trans-Canada Application

Trans-Canada's application asked that its Permit No. TC 64-6 be amended and that the permit and amendments be consolidated into a new permit. The proposed amendments, more fully set out in Section III of this report, would extend the term of the permit, increase the permit volumes, add to the list of fields and pools from which gas may be taken and alter the conditions of the permit in some of their details.

At the hearing, Mr. F. P. Layton, Q. C. and Mr. G. F. Hulme appeared for the applicant.

Alberta and Southern Application

Alberta and Southern applied for amendment of its Permit No. AS 64-3 by an increase in the permit volumes. The application is fully described in Section V of this report. Mr. R. A. MacKimmie, Q. C. appeared for Alberta and Southern.

Date of Reserve Assessment and Period of Protection

Trans-Canada's estimates of gas reserves were based broadly on reserve data to December 31, 1966, but also on reserve increases in certain fields during the first half of 1967 which it wished to have considered. Alberta and Southern's evidence regarding certain fields named in its permit dealt with reserves as of March 31, 1967.

In accordance with a statement made by it during the sittings, in this report the Board presents reserve estimates as of May 31, 1967. The period for which the Board has assessed the requirements of the Province and permit commitments is thirty years commencing June 1, 1967.

In this report, unless otherwise stated, volumes of gas given are those at the standard conditions of 14.65 pounds per square inch absolute and 60 degrees Fahrenheit.

II INTERVENERS

The following registered as interveners at the Trans-Canada hearing:

Interveners	Represented by	Abbreviation of Name Used in Report
City of Edmonton	A. F. Macdonald, Q.C.	City of Edmonton
Westcoast Transmission Company Limited	C. D. Williams, Q.C.	Westcoast
Alberta and Southern Gas Co. Ltd.	R. A. MacKimmie, Q.C.	Alberta and Southern
The British American Oil Company Limited	G. A. McGuffin and R. L. Clarke	British American
Shell Canada Limited	R. B. Noonan	Shell
Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited	B. V. Massie, Q.C.	Utility Companies
Pan American Petroleum Corporation	G. E. Little	Pan American
Alberta Division of the Canadian Petroleum Association	D. W. MacFarlane and J. W. Proctor	CPA
The Alberta Gas Trunk Line Company Limited	A. D. Bessemer, Q.C.	Trunk Line
Hudson's Bay Oil and Gas Company Limited	J. L. Gaffney	Hudson's Bay
Pacific Petroleums Ltd.	G. W. Lade	Pacific Petroleums
Chevron Standard Limited	P. Pisio and C. A. Riddell	Chevron
Independent Petroleum Association of Canada	R. J. Abercrombie	IPAC

Of the above interveners, the City of Edmonton, Westcoast and Alberta and Southern confined themselves to cross-examination of witnesses.

The following registered as interveners at the Alberta and Southern hearing:

Interveners	Represented by	Abbreviation of Name Used in Report
Trans-Canada Pipe Lines Limited	F. P. Layton, Q.C. and G. F. Hulme	Trans-Canada
Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited	B. V. Massie, Q.C.	Utility Companies
Westcoast Transmission Company Limited	C. D. Williams, Q.C.	Westcoast
Alberta Division of the Canadian Petroleum Association	J. W. Proctor	CPA

The Trans-Canada and Westcoast interventions had been filed for the purposes of cross-examination and argument only. It was agreed that the interveners' submissions and arguments presented at the Trans-Canada hearing would apply to the Alberta and Southern application in so far as they were relevant.

III SUBMISSION OF TRANS-CANADA PIPE LINES LIMITED

Trans-Canada asked the Board to amend its Permit No. TC 64-6 by

(a) extending its term by two years to October 31, 1992, (the application as filed requested a one-year extension to October 31, 1991, but at the hearing Trans-Canada amended its application by asking for a two-year extension),

(b) increasing the maximum amount of gas that may be removed in a twenty-four hour period by 175 million cubic feet to 2,170 million cubic feet,

(c) increasing the quantity of gas that may be removed annually by 55 billion cubic feet to 720 billion cubic feet,

(d) increasing the volume of gas that may be removed during the term of the permit by 2.1 trillion cubic feet to 17.1 trillion cubic feet,

(e) adding to the permit a clause permitting the applicant to increase the gas that may be removed in any year by any volumes that may not have been removed during the preceding four years, and

(f) adding to the list of fields, pools, and areas from which gas may be removed from the Province the following:

Berry Creek, Brazeau River, Bruce, Flat Lake, Hamilton Lake North, Jarrow, Killam, Lookout Butte, Malmo, New Norway and Fish Lake.

The Alberta Gas Trunk Line Company Limited, by a letter to the applicant, which appears in the application, stated that it is prepared to construct the facilities necessary to transport the additional volumes requested.

Reserves

Trans-Canada estimated that it should not have any difficulty removing the 17.1 trillion cubic feet requested since it could call on some 19.1 trillion cubic feet of gas; 17.8 trillion cubic feet from fields now in its permit and 1.3 trillion cubic feet from fields, pools, and areas it wishes added to its permit. Of the total, the applicant considered some 18.4 trillion cubic feet to be proved reserves.

Trans-Canada did not make an estimate of the reserves in each field or area of the Province containing gas. It did, however, make estimates for those areas in which it submitted significant development had occurred since the Board's last estimate or where it submitted the Board's estimate to be too low. In this manner, the applicant estimated that at December 31, 1966, the remaining established reserves of the Province were 39.3 trillion cubic feet, or the equivalent of 41.9 trillion cubic feet of 1,000 Btu gas. The 39.3 trillion cubic feet results from adding to the Board's June 30, 1966, estimate of 37.7 trillion cubic feet 1.8 trillion cubic feet as the increase in reserves in the fields under contract to the applicant, 0.3 trillion cubic feet as the increase in certain other fields in the Province, and by subtracting 0.5 trillion cubic feet of gas that was produced since June 30, 1966.

A detailed discussion of Trans-Canada's estimates and comparative estimates of the Board is presented in Appendix A.

Reserves under Contract

Trans-Canada submitted that it had under contract some 17.0 trillion cubic feet of the 19.1 trillion cubic feet it estimated was available to it in the fields now in its permit and in the areas applied for. Trans-Canada contended that in the fields now in the permit some 80 per cent of the gas is under contract to it. It stated that in the new fields 0.8 trillion cubic feet, or some 60 per cent of the reserves, are under contract, and that a significant portion of the reserves in each of the areas requested is under contract to it. Four of the new fields, Bruce, Flat Lake, Jarrow and Killam are in an area subject to development contracts, which require that producers prove up a specified minimum reserve before Trans-Canada is obligated to purchase the gas. Trans-Canada will, however, purchase gas in the area if it causes a large diameter pipe line to be constructed into the area prior to the minimum reserves being developed.

Deliverability

Trans-Canada submitted a detailed deliverability study showing that the entire 17.1 trillion cubic feet of gas applied for could be produced during the term of the permit, if extended in accordance with the application, from the fields in the permit and from the new areas applied for. About 16.4 trillion cubic feet of the total would come from fields now in the permit with the remaining 0.7 trillion cubic feet to come from the new areas.

Trend in Growth of Reserves

The applicant submitted that the long term growth of initial marketable reserves of gas in Alberta has been at the rate of 2.6 trillion cubic feet per year. The rate during the previous two years (1965 and 1966) was 2.95 trillion cubic feet annually.

Surplus

Trans-Canada estimated that using the Board's method of calculation outlined in its recent reports, an overall surplus of 3.3 trillion cubic feet of 1,000 Btu gas existed in the Province at December 31, 1966. The applicant obtained the estimate by updating the calculation presented by the Board in OGCB Report 67-A(1).

Trans-Canada considered that there is a contractable surplus of 4.0 trillion cubic feet and a future deficiency of 0.7 trillion cubic feet, assuming that two years' growth of gas reserves at the long term rate of 2.6 trillion cubic feet per year would be used to meet the future or remaining requirements of the Province.

The applicant argued, therefore, that more than a sufficient surplus exists to meet the additional requested volume of 2.1 trillion cubic feet.

Details of Trans-Canada's calculations appear in Appendix C.

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(1) Report on an Application of Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. January, 1967.

IV SUBMISSIONS OF INTERVENERS UPON THE TRANS-CANADA APPLICATION

Thirteen interventions were filed upon Trans-Canada's application; three, The City of Edmonton, Westcoast Transmission Company Limited, and Alberta and Southern Gas Co. Ltd, were for cross-examination and argument only. Of the remaining ten, seven supported Trans-Canada's application. The other three took a neutral position.

Following is a summary of the submissions of the interveners:

The British American Oil Company Limited

British American submitted estimates of reserves in the Lookout Butte Field and in a portion of the Ghost Pine Field. It estimated the original proved marketable reserves in the Lookout Butte Field to be 456 billion cubic feet and the probable reserve to be 57 billion cubic feet. Regarding the Ghost Pine Field, British American estimated the proved marketable reserves in the Glauconitic zone, the major productive horizon, to be 406 billion cubic feet. It did not submit an estimate of probable reserves.

Further discussion of the submission is presented in Appendix A.

Shell Canada Limited

Shell submitted an estimate of the reserves of gas in the Lookout Butte Field. It estimated the proved marketable gas to be 466 billion cubic feet and the probable reserve to be 123 billion cubic feet. At the hearing Shell's witnesses discussed the reasons why its estimates differed from those submitted by British American.

Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited

The position of the Utility Companies was that the applications should be evaluated using the new method established by the Board and first set out in OGCB Report 66-C(1). In the event of the Board satisfying itself as to the existence of adequate contractable and future surpluses, the Utility Companies indicated they would have no objections to the approval of the increased quantities requested by the applicants for removal from the Province.

With respect to the Province's 30-year requirements for natural gas, the Utility Companies proposed no revisions to their previous estimate of 12.0 trillion cubic feet relating to the period 1966 to 1995, other than an adjustment to make the estimate applicable to the period 1967 to 1996, inclusive. They advocated the Provincial requirements for the latter period be set at 12.4 trillion cubic feet. In response to questions at the hearing, Mr. Maybin, witness for the Utility Companies, indicated that sufficient provision had been made in the estimates to accommodate recent developments in the fertilizer industry. The Utility Companies estimates are considered further in Appendix B.

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(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

Pan American Petroleum Corporation

As a result of additional drilling in the Marten Hills Field during the past year, Pan American has revised its estimate of reserves in the Field. It submitted that the Field now contains 1,083 billion cubic feet of gas, of which it considers 1,004 billion cubic feet to be proved and 79 billion cubic feet to be in the probable category.

Further discussion of the estimate is presented in Appendix A.

The Alberta Division of the Canadian Petroleum Association

The submission of the Alberta Division of CPA supported the application of Trans-Canada and also recommended revised criteria for determining the existence of a removable surplus of gas in the Province. The modifications proposed by CPA were as follows:

(a) the use of probable, as opposed to established, reserves in the calculation of the contractable surplus, and

(b) the use of a minimum of five years, as opposed to two years, trend gas in the calculation of the future and overall surpluses.

CPA defined probable reserves as presently known reserves after full appreciation. In advocating the use of probable reserves, CPA contended that the Board's present reliance on established reserves, which are defined as proved plus a judgment portion of probable reserves, gave inadequate recognition to the appreciation of existing reservoirs consequent on development drilling. For purposes of illustration, CPA included in its submission a specimen calculation of surplus gas using its own estimates of probable reserves. This showed a contractable surplus of 4.8 billion cubic feet as at December 31, 1966.

In recommending the use of five years trend gas, this intervener expressed the view that contractable reserves and contractable requirements should assume primary importance in determining whether or not a surplus of gas exists in the Province. It submitted that the history of exploration in the Province provided convincing evidence as to the ability of the gas industry to meet the remaining requirements. Therefore, greater emphasis should be placed on the ability of the industry to find and prove up new reserves. In support of its argument, CPA made reference to historical trends in the growth of reserves. CPA also cited a study made some years ago in which it was estimated that more than half Alberta's potential reserves remained to be discovered. In these circumstances, CPA concluded that the use of only two years trend gas was unrealistic and constituted an unnecessary burden in that it required the gas industry to carry an excessive inventory of proved reserves.

The witnesses appearing on behalf of CPA argued that probable reserves constituted a valid basis for assessing the contracable surplus, since it was CPA's experience that estimates of extensions to known reservoirs had been more than realized in the past. In effect, CPA wished to credit the whole of the appreciation in existing reserves to its estimates of contractable reserves, whereas the present practice of the Board is to include part of this amount in trend gas. CPA contended that only some 40 per cent of the Board's estimate of trend gas related to new discoveries, the remaining 60 per cent representing appreciation of existing reservoirs. It stated that, as a consequence of its recommendations, it would redefine trend gas to include only new discoveries and the appreciation relating thereto.

Questioned as to the reliance which the Board could safely place on new discoveries, the witnesses stated that this was likely to bear an inverse relationship to the proportion of potential reserves already discovered. The witnesses were also questioned with regard to the discovery rate for gas. CPA was of the opinion that, although the rate of new discoveries had declined in recent years, this was a temporary phenomenon and would be reversed in the future. With respect to the inventory which industry was required to carry as a result of the Board's present procedure, the witnesses agreed that this represented a very small proportion of reserves under contract. However, in the view of CPA, there was a strong probability that the inventory requirement would increase in the future equally with the increase in terminal year peak day requirements. Further comment on CPA's submission is given in Section VII and Appendix B.

The Alberta Gas Trunk Line Company Limited

The estimates of Trunk Line's future requirements for gas related to the period July 1, 1967, to June 30, 1997. Total requirements were divided into two categories: fuel consumption and 'unaccounted for gas'. Fuel consumption pertained mainly to the use of fuel for compressor units, while 'unaccounted for gas' consisted of losses occurring during construction and normal operation. The volumes in both categories were predicated on the basis of existing and applied for permits.

Trunk Line estimated its total requirements over the period would be some 349 billion cubic feet. Testifying on behalf of Trunk Line, Mr. Hushion acknowledged that, at annual rates, Trunk Line's estimates of total requirements represented a significant increase over the volume recorded in 1966. The majority of the growth in Trunk Line's requirements was attributed to the expansion of compression facilities in the system, resulting from the installation of new compressor units and increased utilization of existing units. No attempt was made by Trunk Line to segregate increases associated with the existing and applied for permits. Further reference is made to the estimates in Appendix B.

Hudson's Bay Oil and Gas Company Limited

Hudson's Bay's intervention consisted of an estimate of the reserves of gas in the Brazeau River, Edson and Lone Pine Creek Fields. Its estimates of initial marketable gas were as follows:

Field	Proved (billions of cubic feet)	Probable (billions of cubic feet)
Brazeau River	613	495
Edson	2,100	0
Lone Pine Creek	171	118

Further discussion of the estimates appears in Appendix A.

Chevron Standard Limited

Chevron's intervention was restricted to its estimate of reserves in the Nevis Field. It estimated the initial marketable reserves to be:

	Proved (billions of cubic feet)	Probable (billions of cubic feet)
Nisku Zone	295	10
Leduc Zone	517	0

Independent Petroleum Association of Canada

The submission of IPAC supported the application of Trans-Canada. IPAC emphasized that a favourable marketing environment for natural gas is essential to induce gas oriented exploration. It contended that the establishment of markets precedes the exploration and development of new gas reserves. The granting of the subject applications would provide additional incentives for such exploratory and development activity.

At the hearing, Mr. Abercrombie, witness for IPAC, contended that refusal of the application could have adverse effects on the Alberta gas industry by diverting exploratory efforts to areas outside the Province.

Pacific Petroleums Ltd.

Pacific Petroleums submitted an estimate of its gas requirements for fuel and shrinkage in the Empress plant. It estimated that some 307 billion cubic feet of gas would be required during the period July 1, 1967 to October 31, 1991.

Further discussion of the estimate is presented in Appendix B.

V THE APPLICATION OF ALBERTA AND SOUTHERN GAS CO. LTD.

Alberta and Southern applied to the Board for amendment of its Permit No. AS 64-3 by

(a) increasing the daily volume that may be removed from the Province by 25 million cubic feet to 900 million cubic feet,

(b) increasing the annual volume by seven billion cubic feet to 294 billion cubic feet, and

(c) increasing the total volume of gas that may be removed during the term of the permit by 160 billion cubic feet to 7,090 billion cubic feet.

The applicant stated that the additional gas will be sold to Inland Natural Gas Co. Ltd. for distribution in the West Kootenay district of British Columbia.

Reserves

Alberta and Southern estimated that between June 30, 1966, the date used by the Board in its latest publication of reserves, and March 31, 1967, the remaining reserves of marketable gas increased by some 532 billion cubic feet. Alberta and Southern indicated that a substantial portion of the reserve growth since June 30, 1966, occurred in fields included in its permit. The applicant said that it had information suggesting a further increase of one trillion cubic feet, but was not in a position to submit details to substantiate this further increase. The additional increase occurred in areas for which the applicant has not prepared detailed estimates of reserves or where full details on some wells known to have encountered gas are considered confidential and hence are unavailable.

In view of the rather small increase requested and the growth of reserves, the applicant expressed confidence that the fields in its permit would support the additional volumes for which it applied.

Surplus

The applicant showed that by adding the increase in reserves of 532 billion cubic feet (600 billion cubic feet on a 1,000 Btu basis) to that estimated by the Board as of June 30, 1966, an overall surplus of 0.3 trillion cubic feet results. The calculation made allowance for gas produced since the Board's estimate and the increase in the gas requirements of Alberta that result by advancing the 30-year period of protection.

Summary

Alberta and Southern argued that since the surplus available in Alberta, 0.3 trillion cubic feet, is greater than the 0.16 trillion cubic feet increase applied for, the application should be granted.

VI SUBMISSION OF INTERVENERS UPON THE ALBERTA AND SOUTHERN APPLICATION

Four interventions were filed with respect to the application of Alberta and Southern: by The Alberta Division of the Canadian Petroleum Association, Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited, Westcoast Transmission Company Limited, and Trans-Canada Pipe Lines Limited. The interventions of Trans-Canada and Westcoast were for the sole purposes of cross-examination and argument. After the decision that the interveners evidence at the Trans-Canada hearing would apply to the Alberta and Southern application the interveners submitted no further evidence. The CPA and Utility Companies interventions filed were substantially the same as those filed in the Trans-Canada Pipe Lines Limited hearing, and are discussed in the Trans-Canada portion of this report.

VII BASIS OF CONSIDERATION

Probable Reserves

(1) Views of CPA

CPA took the position that probable reserves, which it defined as presently known reserves with an allowance for full appreciation, should be used both when determining the contractable surplus and in assessing the trends in growth of reserves. In its view the estimates of probable reserves, particularly in the first few years after discoveries, but also to some extent in the later years, were conservative. It argued that since the now established reserves will grow as a result of further development drilling and since the rate of growth can be predicted fairly accurately from past experience probable reserves are a realistic basis for the calculations of the contractable surplus and the trends.

(2) Views of the Board

The Board considers contractable reserves to be the reserves of gas now known and which could be placed under firm contract. The Board agrees that considerable appreciation of presently known reserves and particularly those recently discovered reserves will likely occur, but the individual fields or areas in which the growth will occur and the individual amounts of growth are not known. Furthermore, a purchaser is not now able to offer final definitive contracts for the purchase of this anticipated growth in reserves. There is thus considerable uncertainty in reserve estimates which make allowance for this growth in reserves. The Board, therefore, is not prepared to include the estimated future appreciation of present reserves in contractable reserves. The Board believes that the estimated appreciation should be allocated only for the purposes of meeting future requirements.

The Board recognizes that the trends in growth of reserves could be assessed in terms of probable reserves. However, it believes that the trend in the established reserves is the more significant since these figures reflect what is known with reasonable certainty, and in the more recent years they can differ considerably from the probable reserves. The use of such data (established reserves) covering the more recent years should alert the Board sooner to any changes in the trend which may be developing. Moreover, to employ probable reserve figures for the most recent years would be to include estimates of appreciation, a part of the very trend which the Board is endeavouring to assess. For these reasons the Board is not prepared to adopt the change in the basis of assessing the trends in growth of reserves, from established reserves to probable reserves, suggested by CPA.

Two Years or Five Years of Growth of Reserves

(1) Views of CPA

CPA emphasized the view it had expressed at previous hearings that the Board placed too little reliance on future growth.

It argued that reserves equal to five years of growth of probable reserves should be used when assessing the gas surplus to the needs of Alberta and the permit commitments. CPA added that additional experience gained in both the amount of appreciation and in the rate of discovery of new reserves, since 1959 when the Board first incorporated an allowance for growth of gas reserves in surplus calculations, warrants a larger allowance than heretofore included. It concluded that to stipulate that only two years of growth in gas reserves will be recognized as part of future supplies is ultraconservative and imposes an unnecessary burden of establishing an inventory of proved reserves on the would be permittee. However, it acknowledged that on its assessment this shut in gas amounted, as of December 31, 1966, to only 1.7 trillion cubic feet.

(2) Views of the Board

The Board does not accept CPA's argument that an unnecessary and burdensome amount of gas must remain shut in to meet the future requirements of Alberta. From Table C-7 it may be seen that the contractable reserves within economic reach and not deferred for reasons of oil recovery are 34.1 trillion cubic feet as of May 31, 1967. Of these approximately 6.5 trillion cubic feet are under contract to serve Alberta requirements and some 24.3 trillion cubic feet are subject to permits. The remainder of the contractable reserves, 2.5 trillion cubic feet, is available for removal from the Province so long as the remaining future requirements may be adequately provided for. In fact, as shown by the surplus calculations, this volume is now available for removal from the Province. The only circumstance under which a contractable surplus might not be available for removal from the Province is that where the Board is satisfied that all or a part of it is needed for meeting the remaining future requirements. This matter was discussed at length in OGCB Report 66-C(1) at pages 35 to 40 inclusive.

The Board accepts CPA's argument that reserves not yet known but which can reasonably be counted upon be used to determine surplus. The disagreement is as to the quantity and the manner in which they are used to meet Alberta's remaining requirements. To protect those requirements for gas which will actually have to be delivered (i.e. total remaining requirements less the gas needed to meet the terminal year peak day), the Board believes that its current policy of using reserves equivalent to two years growth should continue unchanged.

To provide for the reserves of gas necessary to ensure deliverability to meet the thirtieth year peak requirements, often called cushion gas, the Board has stated previously that it is prepared to give weight to more than the two years growth in reserves. The Board stated that the additional growth used will depend upon the long term growth rate of gas reserves, the number of years of growth that would be needed to satisfy the portion of the cushion gas requirement not otherwise met, the percentage of the apparent ultimate reserves of the Province that have already been developed, and the likelihood that the peak day requirements would to some extent be supplied by other means, such as, more drilling and more use of storage and compression.

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(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

The Board has therefore decided to continue this policy with respect to the meeting of Alberta's 30-year requirements for gas.

Development Contracts

(1) Views of Trans-Canada

Trans-Canada has negotiated development contracts with producers in Bruce, Flat Lake, Jarrow and Killam, four of the eleven areas included in its present application. It is obligated to purchase gas if the producers develop a specified reserve of gas considerably greater than is now present, or a pipe line is extended into the area. Development contracts, Trans-Canada contended, provide the producers with an incentive to drill for gas. Trans-Canada argued that since the contracts are binding upon it as a purchaser, the areas in which they have been executed should be included in the amendment requested.

(2) Views of the Board

The Board recognizes that development contracts allow producers to proceed with exploration and development drilling within the area with some assurance of a satisfactory market if their efforts are successful. In this way the contracts can contribute to the useful development of reserves in the Province.

On some previous applications where an applicant has sought authority to remove gas under a development contract, the Board has included in the permit parts of the contract areas where reserves have been established. However, in no case would the

Board consider it proper to name in a permit gas reserves that are not established. The part of the area covered by development contracts that would, in a suitable case, be included in a permit is that containing wells by which the presence of gas reserves is proved and as much of the adjacent area as would be included in a field containing such wells by operation of the Board's rules for designating fields.

Under all present circumstances, the Board believes that the developed parts of the area covered by the development contracts held by Trans-Canada should now be included in the permit conditionally, and the applicant given three years to show that the gas will be effectively removed pursuant to the permit. The condition should require Trans-Canada to show the Board within that period that the proposed gas purchase contracts had been completed. If the condition is not met, the Board would be prepared to call a hearing to consider the deletion of the fields from the permit and such consequent adjustments to the contract volumes as may appear suitable at the time.

VIII FINDINGS

The Board having heard publicly the applications under The Gas Resources Preservation Act, 1956, of Alberta and Southern Gas Co. Ltd. and Trans-Canada Pipe Lines Limited, and having studied the evidence submitted by the applicants and the interveners at the public hearings, and having regard to the advice of its staff and to its own knowledge, finds as follows:

1. IN THE MATTER OF THE ESTABLISHED RESERVES OF GAS IN ALBERTA

The Board estimates the established reserves of marketable gas remaining in the Province of Alberta at May 31, 1967, to be some 39.3 trillion cubic feet, or the equivalent of 41.9 trillion cubic feet of 1,000 Btu gas.

Of the latter total, some 2.9 trillion cubic feet are now considered to be beyond economic reach and some 4.9 trillion cubic feet will have production deferred, leaving a contractable reserve of 34.1 trillion cubic feet of 1,000 Btu gas.

The present estimate is some 1.3 trillion cubic feet more than the Board's estimate at December 31, 1966. The increase is largely due to additional drilling and to geological reinterpretations in the Brazeau River, Crossfield East, Edson, Ghost Pine, Nevis and Provost fields.

Details of the Board's estimates and a discussion of the more significant changes are presented in Appendix A.

2. IN THE MATTER OF THE TRENDS IN THE GROWTH OF RESERVES OF GAS IN ALBERTA

The growth in initial marketable reserves of gas over the past 16 years due to new discoveries and to appreciation of previous discoveries has been at the average rate of some 2.5 trillion cubic feet per year. Since the Board did not make an estimate of reserves at May 31, 1965, a precise figure for the growth of gas reserves during the immediately preceding two-year period, June 1, 1965 to May 31, 1967, is not available. However, during the 29-month period, January 1, 1965 to May 31, 1967, reserves increased by 6.2 trillion cubic feet.

In keeping with the Board's policy of using the lesser of the reserves equivalent to those that would be developed in a two-year period at the long term growth rate, or at the rate experienced during the immediately preceding two-year period, the additional reserves to assist in meeting the future requirements of Alberta amount to 5.0 trillion cubic feet.

3. IN THE MATTER OF THE PRESENT AND FUTURE REQUIREMENTS FOR GAS AND THE PRESENT PERMIT COMMITMENTS

The Board estimates Alberta's requirements for the 30 years, June 1, 1967, to May 31, 1997, to be 12.4 trillion cubic feet of 1,000 Btu gas, with a peak day requirement in the thirtieth year of 2.7 billion cubic feet. The present estimate represents an increase of 0.2 trillion cubic feet in the total 30-year requirements since the Board's last estimate, which was for the period, July 1, 1966, to June 30, 1996.

The commitments remaining at May 31, 1967, associated with permits issued for the removal of gas from Alberta, total some 23.5 trillion cubic feet of 1,000 Btu gas.

Details of the Board's estimates of Alberta's requirements and permit commitments are presented in Appendix B.

4. IN THE MATTER OF THE MEETING OF ALBERTA'S 30-YEAR REQUIREMENTS AND PRESENT PERMIT COMMITMENTS, AND THE RESULTING SURPLUS

The Board estimates that reserves totalling some 17.6 trillion cubic feet of 1,000 Btu gas are necessary to meet the annual and peak day requirements of Alberta for the 30-year period, June 1, 1967, to May 31, 1997. Of this total about 12.4 trillion cubic feet are required for actual deliveries with the remaining 5.2 trillion cubic feet needed to meet the thirtieth year peak day.

The Board's estimate of 17.6 trillion cubic feet may also be considered to consist of 6.5 trillion cubic feet of contractable requirements and 11.1 trillion cubic feet of remaining requirements, the latter being a measure of the amount of reserves needed from sources not now under contract or connected to the Alberta market.

The Board estimates that 24.3 trillion cubic feet of 1,000 Btu gas are required to meet the present permit commitments, of which some 0.8 trillion cubic feet represent the reserves required to ensure deliverability in the terminal year for those permits under which it is contemplated that substantial daily withdrawals for which protection has historically been provided will continue to the end of the term.

When the contractable requirement, 6.5 trillion cubic feet, and the gas needed to satisfy the permit commitments, 24.3 trillion cubic feet, are deducted from the contractable reserve of 34.1 trillion cubic feet, a contractable surplus of 3.3 trillion cubic feet results.

The remaining and future reserves, totalling some 11.1 trillion cubic feet, consist of 4.3 trillion cubic feet of deferred gas which will be available within the 30-year period, 1.8 trillion cubic feet of gas now beyond economic reach but which the Board believes will be within economic reach within 30 years, and 5.0 trillion cubic feet representing two years growth of gas reserves at the long term average rate. Comparing the total with the 11.1 trillion cubic feet of remaining Alberta requirements indicates a balance in this future category. This results after full provision for the 3.6 trillion cubic feet required from sources not now connected to meet Alberta's thirtieth year peak day.

The overall surplus before release of reserves required to protect peak day in permits is equal to the contractable surplus of 3.3 trillion cubic feet. The cushion gas released after the expiration of the subsisting permits will increase the overall surplus to 4.1 trillion cubic feet.

Details of the Board's analyses of these matters appear in Appendix C.

5. IN THE MATTER OF THE VOLUMES UNDER CONTRACT AND THE PERMIT VOLUMES APPLIED FOR

(a) Alberta and Southern

The Board is satisfied that Alberta and Southern has under contract the entire volume of gas it requested be added to its permit.

(b) Trans-Canada

The Board finds that Trans-Canada has under contract some 75 per cent of the established reserves, as estimated by the Board, within the fields, pools, and areas which the applicant applied to have added to its permit. Furthermore, the applicant has under contract a sufficient portion of the reserves in each field, pool, or area to warrant its inclusion in the permit. The Bruce, Flat Lake, Jarrow and Killam fields, being under development contracts discussed in Section VII of this report, should be included subject to a condition requiring Trans-Canada to satisfy the Board within three years that the gas will be effectively removed from the Province pursuant to the permit.

6. IN THE MATTER OF THE APPLICATIONS FOR REMOVAL OF ADDITIONAL QUANTITIES OF GAS AND THE SURPLUS WHICH WOULD RESULT IF THE APPLICATIONS WERE GRANTED

The Board finds that the reserves in the fields, pools, and areas named in Alberta and Southern's permit are sufficient to enable the applicant to remove the small additional volume applied for of 0.16 trillion cubic feet.

The additional volume applied for by Trans-Canada, 2.1 trillion cubic feet, consists of 1.1 trillion cubic feet from fields, pools, and areas included in its present permit and 1.0 trillion from new fields. The Board disagrees with Trans-Canada's estimate of reserves in some of the new fields and certain of the fields now in its permit. However, the Board finds that its estimate of total reserves in both groups of fields is some 0.2 trillion cubic feet greater than the volume applied for.

If the removal of the additional volumes requested by the two applicants is authorized, the reserves needed to meet the commitment of all permits would increase from the present 24.3 trillion cubic feet of 1,000 Btu gas, of which 0.8 trillion cubic feet is for the protection of deliveries at the maximum daily rate authorized and anticipated in certain of the permits, to 26.7 trillion cubic feet. The contractable surplus as well as the overall surplus before release of reserves required to protect peak day in certain permits would be reduced from 3.3 trillion cubic feet to 0.9 trillion cubic feet. The release of the cushion gas after the expiration of the permits would increase the overall surplus to 1.7 trillion cubic feet.

Accordingly, the Board finds that the additional volumes of gas applied for are surplus to the requirements of the Province and the present permit commitments. The Board is satisfied that the gas may be produced within a 25-year term - although the Board estimates that the reserves would not, in each case, support deliveries at the maximum daily rates requested during the last several years of the term.

Details of the Board's analyses relating to these matters are presented in Appendix D.

7. IN THE MATTER OF THE OTHER AMENDMENTS APPLIED FOR BY TRANS-CANADA PIPE LINES LIMITED

(1) The application for an extension in the term of its permit

The Board agrees with the applicant that the addition to reserves, the deliverability characteristics of the fields, and the contracts which Trans-Canada has entered into make an extension of the term of the permit desirable.

(2) The application for a provision that volumes of gas authorized but not removed during the preceding four years be removed in subsequent years

The Board agrees with the applicant that it is not practical to maintain the annual quantity of gas removed constant in each year, and believes that the flexibility sought by the applicant is desirable to enable the permittee to realize fully the benefit of the permit. The Board is satisfied that the maximum day limitation in the permit will provide some control over the volumes to be removed. It believes that the permit should be amended to allow the applicant to adjust its annual removals of gas to its sales over a four-year period.

8. IN THE MATTER OF THE DISPOSITION OF THE APPLICATION OF TRANS-CANADA PIPE LINES LIMITED

In the light of its findings and its responsibility under the Act, the Board is prepared, with the approval of the Lieutenant Governor in Council, to amend Permit No. TC 64-6 by increasing the volume of gas which Trans-Canada may remove from the Province by 2.1 trillion cubic feet, by adding the eleven new fields and areas applied for, by extending its term to October 31, 1992, and by making the other amendments applied for by the applicant; the permit and the amendments to be consolidated in the form shown in Appendix E and subject to the terms and conditions therein contained.

9. IN THE MATTER OF THE DISPOSITION OF THE APPLICATION OF ALBERTA AND SOUTHERN GAS CO. LTD.

In the light of its findings and its responsibility under the Act, the Board is prepared, with the approval of the Lieutenant Governor in Council, to amend Permit No. AS 64-3 by increasing the volume of gas which Alberta and Southern may remove from the Province by 0.16 trillion cubic feet; the amendment of permit to be in the form shown in Appendix F and subject to the terms and conditions therein contained.

Respectfully submitted,

G. W. Govier, P. Eng.
Chairman

Vernon Millard
Board Member

Dated at Calgary, Alberta,
this 11th day of October, A. D. 1967.

(NOTE: Mr. A. F. Manyluk, P. Eng., Deputy Chairman of the Board participated in the deliberations leading to this report and was a full party to the decision. Due to absence, he was unable to sign the report.)

APPENDIX A

THE ESTABLISHED RESERVES OF GAS IN ALBERTA

The Board estimates the remaining established reserves of marketable gas in Alberta at May 31, 1967, to have been some 39.4 trillion cubic feet, or the equivalent of 41.9 trillion cubic feet of 1,000 Btu gas. This estimate represents an increase on an actual heating value basis of some 1.3 trillion cubic feet since December 31, 1966, when the Board's estimate was 38.1 trillion cubic feet. On the same basis, Trans-Canada estimated the remaining established reserves at December 31, 1966, to have been 39.3 trillion cubic feet. At the hearing, Trans-Canada submitted revised reserve estimates for certain fields where significant increases had occurred since the year end.

Trans-Canada made its estimate as follows:

		Tcf at 14.65 psia
Board Estimate at June 30, 1966		37.7
Increase		
In Fields under contract to applicant	1.8	
In Clive and Ferrier Fields	0.3	
Total Increase	2.1	
Less Production June 30, 1966, to December 31, 1966	0.5	
Net Increase		1.6
Total Reserves at December 31, 1966		39.3

Trans-Canada stressed that its estimate was conservative because it did not include the increase in reserves since June 30, 1966, in the Rainbow-Zama Lake area. The data needed to make this estimate are confidential and thus not available to Trans-Canada.

Alberta and Southern did not make an estimate of the reserves in the Province. It accepted the Board's estimate at June 30, 1966, and added some 0.6 trillion cubic feet, representing Alberta and Southern's estimate of the growth of reserves to March 31, 1967, in four fields included in its permit. Alberta and Southern indicated that the reserves of the Province at March 31, 1967, should be at least one trillion cubic feet higher than the estimate it presented due to the additional drilling that has occurred since June 30, 1966. Because of its confidential nature, much of the information from this drilling is unavailable to Alberta and Southern.

While only the established reserves are referred to in this report, the Board has calculated proved and probable reserves of gas. The definitions and interrelationships of these categories of reserves are as follows:

Proved Reserves are the recoverable gas reserves within the area of a pool completely delineated by drilled wells. A portion of such reserves may be in drilling spacing units undrilled but so related to wells that there is every reasonable probability that the reserves will be produced either by the wells or by wells to be drilled on the drilling spacing units.

Probable Reserves are the reserves of gas estimated to be recoverable from the pool beyond the proved limits of the pool. The probable pool limits are based on normal geological expectation.

Established Reserves are the reserves of gas whose existence and estimated amount can reasonably be counted upon. They include all of the proved reserves and a judgment portion (usually 50 per cent) of the probable reserves.

In its estimate of reserves, the Board has had regard for the estimates presented by the applicants and interveners at the hearing, the estimates included in various submissions presented recently to the Board, and evaluations made by its staff. In many cases the evaluations contained in submissions have provided the Board with interpretations and data previously unavailable, thereby assisting the Board considerably in making its estimates.

The majority of the increases in the Board's estimate of remaining marketable reserves in the five-month period ending May 31, 1967, were the result of reassessment and development drilling in various pools, whereas the majority of the reductions were due to the marketing of produced gas during the same period.

A comparison of the Board's reserve estimates at the year end and at May 31, 1967, follows:

	Actual Basis	1,000 Btu Basis
	(Trillions of Cubic Feet)	
Remaining Established Reserves of Marketable Gas at December 31, 1966	38.1	40.6
Net Additions to Reserves	1.7	1.7
Marketable Gas Produced	0.4	0.4
Remaining Established Reserves of Marketable Gas at May 31, 1967	39.4	41.9

The following tabulation lists pools or strata for which there have been significant changes in the Board's reserve estimate, or for which there are significant differences between the

Board's estimate and the reserve estimates of other interested parties:

Field or Area Pool or Stratum	Board's Estimate as of Dec.31 1966	Board's Estimate as of May 31 1967	Other Estimators	Other Estimates
	(Billions of Cubic Feet)			
Alderson 2WS A	200	290	None	None
Brazeau River Elkton A	140	450	Trans-Canada Hudson's Bay	570 827
Crossfield East Wabamun A	610	710	Trans-Canada	736
Edson Elkton A	1,680	1,900	Trans-Canada Hudson's Bay	2,000 2,100
Ghost Pine Mannville	100	248	Trans-Canada British American	453 407
Gold Creek Wabamun A	400	300	None	None
Hussar Glauconitic A	260	61	None	None
Marten Hills Wabiskaw A	450	400	Pan American	630
Marten Hills Wabamun A	240	270	Pan American	401
Nevis Devonian	700	810	Trans-Canada Chevron Standard	830 830
Provost Viking A & B	630	800	Trans-Canada	1,000

The Board's reserve estimate for the Alderson 2WS A Pool has increased by 90 billion cubic feet as a result of the drilling of 16 wells since the year end. As of May 31, 1967, the initial marketable reserve was estimated at 290 billion cubic feet by the Board and there were no reserve estimates for this pool submitted by other interested parties.

Reserve estimates for the Brazeau River Elkton A Pool have increased 310 billion cubic feet since the year ending December 31, 1966. Reserves totalling 130 billion cubic feet have been transferred to the pool as a result of a geological re-interpretation of the area. The remaining 180 billion cubic feet represents growth due to additional development drilling. Trans-Canada and Hudson's Bay both estimate more reserves for this pool than does the Board. The Trans-Canada estimate is based on a larger rock volume, and the Hudson's Bay estimate is based on a larger rock volume and some reserves that the Board lists separately as Shunda gas reserves.

Crossfield East Wabamun A Pool reserve estimates by the Board have increased 100 billion cubic feet since the year end as a result of additional development drilling during the interim period. Trans-Canada has estimated these reserves to be 736 billion cubic feet.

Development drilling and geological re-interpretation have increased the Board's reserve estimate for the Edson Elkton A Pool by 220 billion cubic feet to 1,900 billion cubic feet. However, both Trans-Canada and Hudson's Bay submitted larger estimates as a result of geological interpretations that indicate a larger rock volume for the pool.

The Ghost Pine Mannville associated and non-associated reserves are estimated at 248 billion cubic feet by the Board on May 31, 1967. This represents an increase of 148 billion cubic feet since the year ending December 31, 1966. Trans-Canada estimated 453 billion cubic feet while British American estimated

407 billion cubic feet. Interwell correlation and geological interpretation within the Glauconitic pools resulted in isopachs for Trans-Canada and British American in certain areas where the Board had either acreage assignments or isopachs with less areal extent.

At Gold Creek a development well drilled subsequent to May 31, 1967, did not encounter Gold Creek Wabamun A Pool production and resulted in a substantial decrease in the Board's reserve estimate. Since the decrease was substantial and there were no submissions from other interested parties, the Board discussed this reserve estimate with the major operator in the pool before concluding that the information later than May 31, 1967, should, in this instance, be recognized in determining the reserve of the pool. As a result the reserve estimate was reduced from 400 billion cubic feet at the year end to 300 billion cubic feet.

The Hussar Glauconitic A Pool has been restudied recently because pressure data indicated that the former Glauconitic A Pool is composed of several smaller pools. Although this reserve has been reduced by 199 billion cubic feet to an estimate of 61 billion cubic feet, some of the reserves involved have been transferred to the category of Hussar Blairmore (other). In summary the total reduction in Blairmore reserves in the Hussar Field as a result of this restudy was some 130 billion cubic feet.

The Board has reduced the Marten Hills Wabiskaw A Pool reserve estimate by 50 billion cubic feet to 400 billion cubic feet, but increased the Marten Hills Wabamun A Pool reserve estimate by 30 billion cubic feet to 270 billion cubic feet. Pan

American submitted reserve estimates of 630 and 401 billion cubic feet respectively. In both pools Pan American estimates a substantially larger rock volume than does the Board to account for the variation between reserve estimates.

The Nevis Devonian Pool reserves are currently estimated at 810 billion cubic feet by the Board and 830 billion cubic feet by both Trans-Canada and Chevron Standard. The estimate of the Board represents an increase of 110 billion cubic feet and is a result of development drilling within the pools.

The aggregate reserve estimate for Provost Viking A Pool and the Provost Viking B Pool has been increased by some 170 billion cubic feet. About 70 billion cubic feet of the increase results from combining the Provost and Kessler Fields. The remainder, about 100 billion cubic feet, is due to additional drilling and a geological re-interpretation of the areal extent of the Viking pools. Trans-Canada estimated the reserves for the area to be some 1,005 billion cubic feet. The variance between estimates is due primarily to a difference in assessment of the total liquid saturation. The Board believes that an oil saturation of some 15 per cent of the pore volume exists, but Trans-Canada has made no mention of oil saturations in its estimate.

Some of the reserves in the Rainbow and Rainbow South fields are listed in the body of Table A-1. Because much of the data has not yet been released publicly, the remainder of the reserves for these areas and the Zama area are included in the entry "confidential pools" at the end of the table. A considerable portion of the Board's estimate is solution gas, but significant volumes of associated and non-associated reserves also exist.

The Board's estimates of established reserves of gas tabulated by fields and areas are presented in Table A-1. Within each field or area, pools designated by Board orders and having initial marketable reserves of 50 billion cubic feet or greater are shown separately. The reserves of the remaining pools in a field or area are grouped by formation. The table does not show separately fields or areas where the Board's estimate of initial marketable reserves is less than 10 billion cubic feet unless the reserve is supplying a market. In addition, the table does not show reserves by field, area or formation where the data used in calculating the reserves are confidential. The sum of the reserves in non-producing fields or areas having an initial marketable reserve of less than 10 billion cubic feet, and the sum of the reserves in confidential fields, areas, or zones are shown at the end of the table. These reserves are also included in the provincial total.

TABLE A-1

OIL AND GAS CONSERVATION BOARD

ESTABLISHED RESERVES OF GAS IN THE PROVINCE OF ALBERTA, MAY 31, 1967

(14.65 Psia and 60°F.)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BcF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BcF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BcF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BcF	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) BcF	(10) REMARKS
Acheson	Viking	6	25/5	4	2	2	1,020	2	Gas sold to North-Western Utilities, Limited.
	Blairmore	10	20/10	7	-	7	1,020	7	
	Blairmore Assoc.	18	15/10	14	4**	11	1,020*	11	
	Blairmore Solution	3	35/55	1					
	Leduc Solution	76	30/55	24	6	18	1,140	21	
Acheson East	Blairmore	5	20/5	4	-	4	1,090	4	
	Blairmore Assoc.	7	10/5	6	-	6	1,090	7	
Aden	Bow Island	5	20/5	4	-	4	1,000	4	
	Basal Colorado	6	15/5	5	1	4	1,000	4	Gas sold to Canadian-Montana Gas Company Limited.
	Sunburst-Swift	3	20/5	2	1	1	1,040	1	
	Mississippian	12	10/10	10	6	4	1,040	4	
Alderson	Milk River	32	25/5	23	5	18	960	17	Supplies local utility.
	2 WS A	410	25/5	290	-	290	995	288	
	2 WS (Other)	4	20/10	3	-	3	995	3	
	Bow Island	26	20/5	20	-	20	1,000	20	
	Basal Colorado	12	15/5	10	-	10	1,030	10	
Alexander	Basal Quartz A	140	15/5	110	104	6	1,060*	6	Gas sold to North Canadian Oils Limited and Calgary Power Ltd.
	Blairmore (Other)	4	15/5	3	2	1	1,060*	1	
Alix	Blairmore	12	10/5	10	-	10	1,090	11	
	Nisku	1	20/10	1	-	1	1,130	1	
	Nisku Assoc.	7	15/10	5	-	5	1,130*	6	
Ante Creek	Peace River	10	15/5	8	-	8	1,000	8	
	Gething	19	15/5	15	-	15	1,000	15	
	Triassic	5	15/5	4	-	4	1,140	5	
Antelope	Viking	20	20/5	15	1	14	1,020	14	Gas sold to Trans-Canada Pipe Lines.
	Banff	13	20/5	10	5	5	1,020	5	
Athabasca	Blairmore	6	15/5	5	2	3	1,000*	3	Supplies local Utility.
	Wabamun	4	10/5	3	-	3	980*	3	
Athabasca East	Blairmore	1	20/5	1	-	1	1,090	1	
	Wabamun	2	10/5	2	1	1	1,000	1	Supplies local utility.

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Atim	Viking	1	20/5	1	-	1	1,000	1	
	Mannville	2	15/5	2	1	1	1,070	1	Gas sold to Canadian Industrial Gas & Oil Ltd.
Atlee-Buffalo	Viking A	73	25/5	52	11	41	970*	40	Gas sold to Trans-Canada Pipe Lines Limited.
	Viking (Other)	48	25/5	34	1	33	970*	32	
	Basal Colorado	7	10/5	6	-	6	1,020	6	
	Mannville	72	20/5	55	-	55	960*	53	
Bantry	Milk River	46	20/5	35	1	34	960	33	Supplies local utility.
	Bow Island	26	20/5	20	-	20	970	19	
	Basal Colorado	3	20/5	2	1	1	970	1	
	Mannville	37	15/5	30	2	28	1,030	29	
	Mannville Assoc.	33	10/10	27	-	27	1,160	31	
Baptiste	Blairmore	1	20/5	1	-	1	970	1	Presently considered beyond economic reach.
	Wabamun	14	20/5	11	-	11	980	11	
Bashaw	Viking	1	25/5	1	-	1	970	1	
	Blairmore	13	10/5	11	-	11	970	11	
	Blairmore Assoc.	12	20/5	9	-	9	1,000	9	
	Leduc Assoc.	18	20/15	12	-	12	1,220	15	
Bawlf	Viking	11	25/5	8	-	8	1,020	8	Presently considered beyond economic reach.
	Blairmore	4	20/5	3	-	3	1,050	3	
Beaver Crossing	Colony	2	30/5	1	-	1	1,000	1	Supplies local utility.
Beaverhill Lake-Fort Saskatchewan	Viking (Main)	610	15/5	490	110	380	1,020	388	Gas sold to North-western Utilities, Limited and Canadian Industrial Gas & Oil Ltd.
	Viking (Other)	37	15/5	30	-	30	1,020	31	
	Mannville	4	15/5	3	-	3	1,000	3	
Bellis	Mannville	7	20/5	5	-	5	1,015	5	
	Nisku	45	15/5	36	-	36	1,000	36	
Belloy	Notikewin	9	20/5	7	-	7	1,000	7	
	Gething	62	15/5	50	-	50	980	49	
	Mississippian	23	10/5	20	-	20	1,120	22	
Benjamin Creek	Rundle	100	15/20	70	-	70	1,070	75	
Berland River	Leduc A	440	10/25	300	-	300	1,000	300	
Berland River West	Wabamun	24	10/30	15	-	15	1,020	15	Presently considered beyond economic reach.

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Bigoray	Paskapoo	2	40/5	1	-	1	1,000	1	
	Blairmore	16	15/5	13	-	13	1,080	14	
	Rundle	19	20/10	14	-	14	1,080	15	
Bigstone	Gething	23	10/5	20	-	20	1,100	22	
	Dunvegan	53	10/5	45	-	45	1,140	51	
	Wabamun	10	15/40	5	-	5	1,050	5	
	D-3 A	390	15/25	250	-	250	990	248	
Bindloss	Viking A	400	15/5	320	91	229	980	224	Gas sold to Trans-Canada Pipe Lines Limited.
	Viking (Other)	41	15/5	33	2	31	980	30	
	Mannville	31	15/5	25	-	25	990	25	
Bittern Lake	Viking	3	25/5	2	-	2	1,020	2	
	Blairmore	62	15/5	50	-	50	1,070	54	
Black Butte	Second White Specks	3	20/5	2	-	2	960	2	
	Bow Island	21	15/5	17	2	15	1,010	15	Gas sold to Canadian-Montana Gas Company Limited.
	Basal Colorado	25	15/5	20	8	12	1,000	12	
	Mannville	6	15/5	5	-	5	1,000	5	
	Sunburst-Ellis	37	15/5	30	24	6	1,000	6	
	Mississippian	11	10/5	9	3	6	1,020	6	
Blueridge	Detrital	14	10/5	12	-	12	1,100	13	Presently considered beyond economic reach.
	Mississippian	1	20/5	1	-	1	1,130	1	
Bonnie Glen	Cardium Solution	2	35/10	1	-	1	1,040*	1	
	Viking	3	15/10	2	-	2	1,050	2	
	Blairmore	5	15/10	4	3	1	1,100	1	Gas sold to North-western Utilities, Limited.
	Graminia	1	15/10	1	-	1	1,100	1	
	Leduc	15	30/15	9	6	3	1,220*	4	
	D-3 A Assoc.	430	15/15	310	-	310	1,220*	378	
	D-3 A Solution	570	35/25	280	44	236	1,220*	288	
Bonnyville	Blairmore	4	20/5	3	2	1	980	1	Supplies local utility.
	Blairmore Assoc.	1	20/5	1	-	1	980	1	
Boundary Lake South	Cadomin	11	20/10	8	-	8	1,060	8	
	Triassic	1	15/10	1	-	1	1,050	1	
	Mississippian	58	15/5	47	19	28	1,040*	29	Gas sold to Westcoast Transmission Company Limited.
Bow Island	Bow Island	20	20/5	15	−3	18	1,110	20	Canadian Western Natural Gas Company Limited storage reservoir.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
BOYLE	BLAIRMORE	3	20/5	2	-	2	1,000	2	
	DETRITAL	1	15/5	1	-	1	1,000	1	
	NISKU	10	15/5	8	-	8	990	8	
BRAEBURN	CADOMIN	4	20/5	3	-	3	1,060*	3	
	TRIASSIC	27	15/10	21	3	18	1,090*	20	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED.
	PERMO-PENN	52	15/10	40	2	38	1,030*	39	
BRAZEAU RIVER	ELKTON A	590	15/10	450	-	450	1,040*	468	
	ELKTON (OTHER)	43	15/10	33	-	33	1,040*	34	
	SHUNDA	110	20/15	75	-	75	1,080*	81	
BROOKS	MILK RIVER	9	20/5	7	4	3	990	3	SUPPLIES LOCAL UTILITY.
BROWN CREEK	RUNDLE	59	20/15	40	-	40	970	39	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
BRUCE	VIKING	14	25/5	10	-	10	1,000	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	7	20/5	5	-	5	1,020	5	
BURNT TIMBER	RUNDLE A	370	15/20	250	-	250	1,080	270	
CALAIS	GETHING	22	15/5	18	-	18	1,000	18	SUPPLIES LOCAL UTILITY.
	CADOMIN	12	15/5	10	-	10	1,000	10	
	LEDUC	1	10/25	1	-	1	1,080	1	
CALLING LAKE	MANNVILLE	3	25/5	2	-	2	1,000	2	
	NISKU	49	25/5	35	-	35	1,000	35	
CAMPBELL-NAMAO	BLAIRMORE	4	15/5	3	-	3	1,020	3	
	BLAIRMORE ASSOC.	26	15/5	21					GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD.
	BLAIRMORE SOLUTION	8	40/15	4	16**	9	1,020*	9	
CARBON	BELLY RIVER	1	20/5	1	-	1	990	1	
	VIKING	5	20/5	4	-	4	1,020	4	
	BASAL COLORADO	4	15/5	3	-	3	1,020	3	
	GLAUCONITIC	160	15/5	130	16	114	1,100	125	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED
	MISSISSIPPIAN	4	15/5	3	-	3	1,110	3	
CAROLINE	VIKING	1	15/10	1	-	1	1,130	1	
	VIKING A ASSOC.	160	15/10	120	-	120	1,130	136	
	BLAIRMORE	39	15/10	30	-	30	1,070	32	
	MISSISSIPPIAN	26	15/10	20	-	20	1,020*	20	
CARSON CREEK	MISSISSIPPIAN	5	15/5	4	-	4	1,030	4	
	BEAVERHILL LAKE A	210	15/15	150	5	145	1,050*	152	RESERVOIR BEING CYCLED.
	BEAVERHILL LAKE B	110	15/15	80	-12	92	1,050*	97	RESERVOIR BEING CYCLED.

TABLE A-1 (Cont'd)

(1) Field or Area	(2) Zone	(3) Initial Gas in Place BcF	(4) Losses Reservoir/Surface Per Cent	(5) Initial Marketable Gas BcF	(6) Marketable Gas Produced to May 31, 1967 BcF	(7) Remaining Marketable Gas May 31, 1967 BcF	(8) Estimated Heating Value Btu/cu ft	(9) Remaining Marketable Gas (1000 Btu Basis) BcF	(10) Remarks
Carson Creek North	Beaverhill Lake Assoc.	28	15/15	20	-	20	1,100	22	
	Beaverhill Lake B Solution	340	60/20	110	5	105	1,100	116	Gas injected into Carson Creek.
	Beaverhill Lake Solution (Other)	110	55/20	38	2	36	1,100	40	
Carstairs	Blairmore	14	15/10	11	-	11	1,100	12	
	Elkton A	1,100	15/10	860	198	662	1,140	755	Gas sold to Trans-Canada Pipe Lines Limited.
	Elkton Assoc.	5	15/10	4	-	4	1,140	5	
Castor	Viking	7	20/5	5	-	5	1,040	5	Supplies local utility.
	Mannville	4	15/5	3	-	3	1,090	3	
Cessford	Viking	110	20/5	83	9	74	1,020*	76	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado A	1,000	15/5	820	272	548	1,020*	559	
	Basal Colorado E	170	15/5	140	32	108	1,060*	115	
	Basal Colorado (Other)	48	15/5	39	5	34	1,020*	35	
	Mannville A	97	15/5	78	11	67	1,030*	69	
	Mannville H	68	15/5	55	18	37	1,030*	38	
	Mannville (Other)	260	15/5	210	48	162	1,030*	167	
	Mannville Assoc.	25	20/5	19	-	19	1,030*	20	
Chambers	Blairmore	5	15/10	4	-	4	1,030	4	
	Elkton	12	15/15	9	-	9	1,080	10	
Charlotte Lake	Blairmore	1	25/5	1	-	1	1,000	1	Supplies RCAF Station at Cold Lake.
Chigwell	Blairmore	51	10/10	41	11	30	1,100	33	Gas sold to Trans-Canada Pipe Lines Limited.
	Blairmore Assoc.	23	10/10	19	-	19	1,100*	21	
Chinook Ridge	Paddy	13	20/10	9	-	9	1,020	9	Presently considered beyond economic reach.
	Cadotte	32	20/10	23	-	23	1,020	23	
	Notikewin	21	20/10	15	-	15	1,020	15	
Chisholm	Blairmore	12	10/5	10	-	10	1,020	10	Presently considered beyond economic reach.
Clear Hills	Gething	2	15/5	2	-	2	980	2	Presently considered beyond economic reach.
	Triassic	8	10/5	7	-	7	1,030	7	
	Leduc	4	15/5	3	-	3	1,070	3	
Clive	Viking	4	20/5	3	-	3	990	3	
	Mannville	6	15/5	5	-	5	1,020	5	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
CLIVE (CONT'D)	NISKU ASSOC.	31	10/15	24	-	24	1,150	28	
	LEDUC ASSOC.	25	10/25	17	-	17	1,200	20	
COLD LAKE	BLAIRMORE	8	30/5	5	3	2	1,000	2	SUPPLIES LOCAL UTILITY.
COMREY	SECOND WHITE SPECKS	5	20/5	4	-	4	940	4	
	BOW ISLAND	29	10/5	25	16	9	940	8	GAS SOLD TO CANADIAN MONTANA GAS COMPANY LIMITED.
	SAWTOOTH	1	20/5	1	-	1	1,000	1	
CONNORSVILLE	VIKING	8	20/5	6	1	5	990	5	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BLAIRMORE	67	15/5	54	3	51	1,130	58	
COUNTESS	BOW ISLAND	92	20/5	70	5	65	1,000*	65	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BASAL COLORADO	140	25/5	100	62	38	1,000*	38	
	BLAIRMORE	51	15/5	41	4	37	1,020	38	
	MISSISSIPPIAN	2	15/5	2	-	2	960	2	
	MISSISSIPPIAN ASSOC.	3	20/10	2	-	2	960	2	
CRAIGEND	BLAIRMORE	42	25/5	30	-	30	1,000	30	
	GROSMONT A	210	25/5	150	-	150	1,000	150	
CRAIG LAKE	VIKING	1	20/5	1	-	1	1,000	1	SUPPLIES LOCAL UTILITY.
CROSSFIELD	CARDIUM SOLUTION	73	70/45	12	1	11	1,180	13	
	BASAL QUARTZ A	81	15/10	62	-	62	1,100	68	GAS SOLD TO TRANS-CANADA PIPE LINES LTD., ALBERTA AND SOUTHERN GAS CO. LTD. AND WESTCOAST TRANSMISSION COMPANY LIMITED.
	BASAL QUARTZ (OTHER)	33	15/10	25	-	25	1,100	28	
	RUNDLE A	1,230	10/10	1,000	112	888	1,120*	995	
	RUNDLE B	930	15/15	670	153	517	1,120*	580	
	RUNDLE (OTHER)	13	15/10	10	-	10	1,120*	11	
	WABAMUN A	2,140	15/50	910	55	855	1,120*	958	
CROSSFIELD EAST	BLAIRMORE	5	15/10	4	-	4	1,000	4	
	ELKTON A	120	10/15	90	22	68	1,120	76	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	WABAMUN A	1,860	15/55	710	-	710	1,060	752	
DONALDA	VIKING	40	20/5	30	-	30	970	29	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	5	15/5	4	-	4	970	4	
	DETRITAL	5	15/5	4	-	4	990	4	
DOWLING LAKE	MANNVILLE	5	20/5	4	1	3	1,030*	3	SUPPLIES LOCAL UTILITY.
DRUMHELLER	VIKING	4	25/5	3	-	3	1,080	3	
	BLAIRMORE	48	15/5	39	-	39	1,080	42	
	BLAIRMORE ASSOC.	6	15/5	5	-	5	1,080	5	
	MISSISSIPPIAN	3	20/10	2	-	2	1,080	2	

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE Bcf	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS Bcf	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 Bcf	(7) REMAINING MARKETABLE GAS MAY 31, 1967 Bcf	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) Bcf	(10) REMARKS
Duhamel	Viking	5	10/5	4	-	4	1,000	4	Presently considered beyond economic reach.
	Blairmore	4	15/5	3	-	3	1,030	3	
	Nisku Assoc.	2	10/10	2	-	2	1,100	2	
	Leduc Solution	4	50/55	1	-	1	1,100	1	
Dunvegan	Cadotte	10	25/5	7	-	7	1,010	7	Presently considered beyond economic reach.
	Debolt	4	10/5	3	-	3	1,040	3	
Duvernay	Viking	4	20/5	3	2	1	1,000*	1	Gas sold to Western Minerals Ltd. plant and supplies local utility.
Dyberg	Belly River	3	20/5	2	-	2	950	2	Presently considered beyond economic reach.
	Viking	8	10/5	7	-	7	1,000	7	
	Blairmore Assoc.	12	10/5	10	-	10	1,020	10	
Eaglesham	Gething Assoc.	6	15/5	5	-	5	1,000	5	
	Cadomin Assoc.	6	15/5	5	-	5	1,060	5	
	Mississippian	62	15/5	50	-	50	1,110	56	
Edson	Gething A	92	15/10	70	-	70	1,050	74	
	Elkton A	2,480	15/10	1,900	66	1,834	1,030	1,890	Gas sold to Trans-Canada Pipe Lines Limited.
	Elkton (Other)	29	15/10	22	-	22	1,030	23	
	Shunda	12	25/10	8	-	8	1,030	8	
Edwand	Mannville	4	20/5	3	-	3	1,000	3	Supplies local utility.
Elk Point	Blairmore	3	20/5	2	1	1	990*	1	Supplies local utility.
Ellerslie	Blairmore Assoc.	2	25/15	1	-	1	1,000	1	Gas sold to Edmonton Liquid Gas Ltd.
Enchant	Milk River	4	25/5	3	-	3	1,030	3	
	Bow Island	29	20/5	22	3	19	960*	18	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado	1	25/5	1	-	1	1,000	1	
	Mannville	15	20/10	11	2	9	1,040*	9	
	Jurassic	3	25/10	2	-	2	1,030	2	
	Mississippian	5	15/10	4	1	3	1,040	3	
Equity	Mannville	4	20/5	3	-	3	1,000	3	
	Mississippian	26	25/10	20	-	20	1,100	22	
Erskine	Viking	4	20/5	3	-	3	1,040	3	
	Blairmore	21	20/10	15	2	13	1,090	14	Gas sold to Trans-Canada Pipe Lines Limited.
	Leduc Assoc.	29	10/20	21	-	21	1,070	22	
	Leduc Solution	16	50/75	2	-	2	1,110	2	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
ESTHER	VIKING	21	25/5	15	-	15	990	15	
	BANFF	21	15/5	17	-	17	1,000	17	
ETZIKOM	BOW ISLAND A	79	20/5	60	32	28	930	26	GAS SOLD TO SOUTH ALBERTA PIPE LINES LTD.
	MANNVILLE	1	25/5	1	-	1	1,010	1	
EXCELSIOR	VIKING	9	20/5	7	3	4	1,000	4	GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD. AND PLAINS-WESTERN GAS & ELECTRIC CO. LTD.
	MANNVILLE ASSOC.	39	10/5	33	-	33	970	32	
EYREMORE	BOW ISLAND	15	30/5	10	-	10	960	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
FAIRYDELL-BON ACCORD	VIKING A	100	20/5	78	23	55	1,020*	56	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	VIKING (OTHER)	9	20/5	7	-	7	1,020*	7	
	BLAIRMORE	16	20/5	12	2	10	990*	10	
	BLAIRMORE ASSOC.	7	15/10	5	-	5	990*	5	
FAUST SOUTH	GETHING	12	10/5	10	-	10	990	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
FENN-BIG VALLEY	VIKING	25	20/90	2	1	1	1,000*	1	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	NISKU SOLUTION	150	35/85	15	6	9	1,110*	10	
	LEDUC SOLUTION	11	40/85	1	-	1	1,110*	1	
FERRIER	CARDIUM	8	15/10	6	-	6	1,000	6	
	CARDIUM E ASSOC.	390	15/10	300	-	300	1,000	300	
	VIKING SOLUTION	31	35/25	15	-	15	1,100	16	
	JURASSIC	4	25/5	3	-	3	1,080	3	
	MISSISSIPPIAN	3	20/10	2	-	2	1,100	2	
FIGURE LAKE	VIKING	4	25/5	3	-	3	960	3	
	BLAIRMORE	13	20/5	10	-	10	1,000	10	
	NISKU	25	15/5	20	-	20	1,000	20	
FIRE	SLAVE POINT	8	10/15	6	-	6	1,050	6	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	ELK POINT	16	15/10	12	-	12	1,050	13	
FLAT BUSH	BLAIRMORE	26	20/5	20	-	20	1,000	20	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
FLAT LAKE	BLAIRMORE	5	30/5	3	-	3	1,020	3	
	WABAMUN	83	30/5	55	-	55	1,040	57	
FOREMOST	BOW ISLAND	31	15/5	25	6	19	950	18	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
FORT KENT	BLAIRMORE	6	25/5	4	1	3	980	3	SUPPLIES LOCAL UTILITY.
FOX CREEK	VIKING	100	25/5	71	-	71	1,160	82	
	CADOMIN	36	20/5	27	-	27	1,160	31	
	TRIASSIC	5	15/10	4	-	4	1,160	5	
GARRINGTON	VIKING	4	15/5	3	-	3	1,130	3	
	BLAIRMORE	12	15/10	9	-	9	1,010	9	
	MISSISSIPPIAN	1	15/10	1	-	1	1,020	1	
	LEDUC	29	15/20	20	-	20	1,020	20	
	LEDUC ASSOC.	15	15/20	10	-	10	1,020	10	
GHOST PINE	VIKING	11	25/5	8	-	8	1,020	8	
	MANNVILLE	260	20/5	200	-	200	1,030	106	
	MANNVILLE ASSOC.	63	20/5	48	-	48	1,050	50	
	RUNDLE	22	15/10	17	-	17	1,070	18	
GILBY	CARDIUM	3	15/10	2	-	2	1,000	2	
	VIKING	3	20/5	2	-	2	1,220	2	
	VIKING ASSOC.	1	25/5	1	-	1	1,220	1	
	BLAIRMORE	140	20/15	93	12	81	1,090*	88	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BLAIRMORE ASSOC.	4	20/10	3	-	3	1,090*	3	
	BASAL MANNVILLE A - JURASSIC D	220	15/10	170	11	159	1,090*	173	
	JURASSIC A	88	20/10	63	3	60	1,090*	65	
	JURASSIC (OTHER)	19	15/15	14	-	14	1,090*	15	
	JURASSIC E ASSOC.	86	20/10	62	2	60	1,090*	65	
	JURASSIC ASSOC. (OTHER)	12	10/15	9	7	2	1,090*	2	
	RUNDLE C	220	10/15	170	52	118	1,090*	129	
	RUNDLE D	170	15/15	120	26	94	1,090*	102	
	RUNDLE (OTHER)	41	15/10	31	-	31	1,090*	34	
	RUNDLE ASSOC.	1	20/15	1	-	1	1,100	1	
	WABAMUN	7	10/20	5	-	5	1,170	6	
GLENEVIS	BLAIRMORE	17	20/10	12	-	12	1,040	12	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
GLEN PARK	BLAIRMORE	5	20/5	4	1	3	1,140	3	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	LEDUC SOLUTION	16	35/15	9	1	8	1,250	10	
GOLD CREEK	CADOMIN	10	15/15	7	-	7	1,050	7	
	WABAMUN A	540	20/30	300	-	300	1,050	315	
	WABAMUN B	91	20/30	51	-	51	1,050	54	
GOLDEN SPIKE	VIKING	8	20/5	6	1	5	1,050	5	GAS INJECTED INTO LEDUC ZONE.
	BLAIRMORE	24	15/5	19	1	18	1,050	19	

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE Bcf	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS Bcf	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 Bcf	(7) REMAINING MARKETABLE GAS MAY 31, 1967 Bcf	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) Bcf	(10) REMARKS
Golden Spike (Cont'd)	Wabamun	25	10/10	20	11	9	1,060	10	
	Nisku	4	15/15	3	-	3	1,220	4	
	Nisku Solution	6	35/20	3	1	2	1,220	2	
	D-3 A Solution	130	10/35	75	-25	100	1,290	129	
Goodwin Lake	Blairmore	1	25/10	1	-	1	1,050	1	Presently considered beyond economic reach.
	Jurassic	20	15/10	15	-	15	1,070	16	
Gordondale	Peace River	35	15/5	28	24	4	1,000	4	Gas sold to Westcoast Transmission Company Limited.
	Gething	53	15/5	43	29	14	1,020	14	
Greencourt	Jurassic-Detrital	65	15/10	50	-	50	1,070	54	Presently considered beyond economic reach.
	Pekisko Assoc.	37	25/10	25	-	25	1,130	28	
Hackett	Blairmore	62	10/10	50	5	45	1,100	50	Gas sold to Trans-Canada Pipe Lines Limited.
Hairy Hill	Viking	1	25/5	1	-	1	980	1	
	Blairmore	23	10/5	20	10	10	1,000*	10	Gas sold to Western Minerals Limited.
	Nisku	3	20/5	2	-	2	1,000	2	
Halliday	Viking	5	20/5	4	-	4	1,040	4	Gas sold to Trans-Canada Pipe Lines Limited.
Hamelin Creek	Cadotte	3	20/5	2	-	2	1,000	2	
	Gething	4	15/5	3	-	3	1,010	3	
	Cadomin	21	15/5	17	5	12	1,060	13	Supplies local utility.
	Triassic	1	25/5	1	-	1	1,160	1	
Hamilton Lake	Viking	14	25/5	10	-	10	1,040	10	
	Viking Assoc.	7	25/5	5	-	5	1,040	5	
	Blairmore	7	15/5	6	-	6	1,050	6	
Hanna	Viking	10	15/5	8	-	8	1,040	8	
	Blairmore	3	15/5	2	-	2	1,050	2	
	Mississippian	1	20/5	1	-	1	1,080	1	Supplies local utility.
Harmattan East	Rundle Assoc.	1,180	10/15	900	-10	910	1,080	983	Reservoir being cycled. Gas injected into gas cap.
	Rundle Solution	170	45/25	71	10	61	1,280	78	
Harmattan-Elkton	Blairmore	2	10/5	2	-	2	1,020	2	
	Rundle	55	15/5	40	2	38	1,040	40	Gas sold to Trans-Canada Pipe Lines Limited.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
HARMATTAN-ELKTON (CONT'D)	RUNDLE C ASSOC.	1,150	10/15	880	-28	908	1,080*	981	RESERVOIR BEING CYCLED.
	RUNDLE ASSOC. (OTHER)	28	15/15	20	6	14	1,080*	15	GAS INJECTED INTO GAS CAP.
	RUNDLE C SOLUTION	180	35/30	83	22	61	1,280*	78	
	D-3 A	530	20/60	170	1	169	1,100	186	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
HEART RIVER	CADOTTE	2	15/5	2	1	1	1,000	1	SUPPLIES LOCAL UTILITY.
	NOTIKEWIN	2	10/5	2	-	2	1,000	2	
HERCULES	VIKING	21	15/5	17	-	17	1,050	18	
	BLAIRMORE	38	20/5	29	-	29	960	28	
HIGH PRAIRIE	CADOTTE	4	15/5	3	-	3	1,000	3	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	NOTIKEWIN	8	15/5	6	-	6	1,100	7	
	GETHING	1	15/5	1	-	1	1,000	1	
HOLBURN	CARDIUM	8	20/5	6	2	4	980	4	GAS INJECTED INTO GOLDEN SPIKE.
	BLAIRMORE	24	15/10	18	-	18	1,120	20	
HOLMBERG	BLAIRMORE	26	15/5	21	-	21	1,050	22	GAS SOLD TO BAROID OF CANADA, LTD. PLANT.
HOMEGLEN-RIMBEY	D-3 ASSOC.	1,120	20/15	760	201**	596	1,070*	638	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND ALBERTA AND SOUTHERN GAS CO. LTD.
	D-3 SOLUTION	87	50/15	37					
HUNTER VALLEY	MISSISSIPPIAN	78	15/25	50	-	50	1,080	54	
HUSSAR	BELLY RIVER	3	25/5	2	1	1	1,000	1	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	VIKING	40	20/5	30	8	22	1,020*	22	
	VIKING ASSOC.	31	25/5	22	-	22	1,020*	22	
	BASAL COLORADO	56	25/5	40	13	27	1,020*	28	
	GLAUCONITIC A	80	20/5	61	34	27	1,050*	28	
	GLAUCONITIC N	120	15/5	100	44	56	1,050*	59	
	BLAIRMORE (OTHER)	210	15/5	170	13	157	1,050*	165	
	BLAIRMORE ASSOC.	82	20/5	62	8**	65	1,050*	68	
	BLAIRMORE SOLUTION	20	35/15	11					
INLAND	VIKING	21	25/5	15	-	15	980	15	
INNISFAIL	BLAIRMORE	1	20/15	1	-	1	1,050	1	
	MISSISSIPPIAN	22	10/10	18	-	18	1,080	19	
	WABAMUN	3	15/15	2	-	2	1,170	2	
	LEDUC ASSOC.	17	10/35	10	-	10	1,020	10	
	D-3 SOLUTION	200	45/45	60	15	45	1,130*	51	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE Bcf	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS Bcf	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 Bcf	(7) REMAINING MARKETABLE GAS MAY 31, 1967 Bcf	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) Bcf	(10) REMARKS
Jarvie	Viking	10	25/5	7	-	7	1,040	7	Presently considered beyond economic reach.
	Blairmore	10	15/5	8	-	8	1,100	9	
Jenner	Bow Island	4	25/5	3	-	3	990	3	
	Basal Colorado	7	20/5	5	-	5	1,040	5	
	Mannville	20	20/5	15	-	15	1,050	16	
	Mannville Assoc.	9	20/5	7	-	7	1,050	7	
	Pekisko Assoc.	3	15/5	2	-	2	1,000	2	
Joarcam	Viking	3	25/5	2	-	2	1,040	2	
	Viking Assoc.	70	25/5	50	-	50	1,040	52	
Joffre	Viking	1	25/5	1	-	1	1,000	1	
	Blairmore	44	20/10	32	-	32	1,020	33	
	Leduc Assoc.	4	15/10	3	-	3	1,050	3	
Judy Creek	Viking	53	20/5	40	1	39	1,020	40	Gas sold to North-western Utilities, Limited and Alberta and Southern Gas Co. Ltd.
	Beaverhill Lake A Solution	540	55/30	170	11	159	1,080*	172	
	Beaverhill Lake B Solution	270	50/30	93	5	88	1,080*	95	
Judy Creek South	Mississippian	12	10/10	10	-	10	1,050*	10	Presently considered beyond economic reach.
Jumping Pound	Mississippian	780	15/15	560	243	317	1,050*	333	Gas sold to Canadian Western Natural Gas Company Limited.
Jumping Pound West	Rundle A	880	20/20	560	-	560	1,050	588	
	Rundle B	210	20/15	140	-	140	1,050	147	
Kaybob	Notikewin A	200	15/5	160	10	150	1,100*	165	Gas sold to Alberta and Southern Gas Co. Ltd.
	Notikewin B	120	15/5	98	40	58	1,100*	64	
	Notikewin (Other)	24	15/5	19	-	19	1,100*	21	
	Spirit River	9	15/5	7	-	7	1,000	7	
	Gething	16	15/5	13	-	13	1,050	14	
	Cadomin	47	15/5	38	-	38	1,040	40	
	Cadomin B Assoc.	77	15/5	62	-	62	1,040	65	
	Wabamun	1	20/10	1	-	1	1,070	1	
	Winterburn	5	15/35	3	-	3	1,070	3	
	Beaverhill Lake	1	20/15	1	-	1	1,070	1	
	Beaverhill Lake Assoc.	6	20/15	4	-	4	1,140	5	
	Beaverhill Lake A Solution	330	60/25	100	8	92	1,140	105	

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BcF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BcF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BcF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BcF	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) BcF	(10) REMARKS
Kaybob South	Viking	22	25/5	16	-	16	1,100	18	
	Cadomin	79	20/5	60	-	60	1,040	62	
	Triassic	3	20/5	2	-	2	1,160	2	
	Triassic Assoc.	3	20/5	2	-	2	1,160	2	
	Triassic A Solution	99	30/25	52	-	52	1,160	60	
	Nisku	21	10/20	15	-	15	1,240	19	
	Beaverhill Lake A	310	15/35	170	-	170	1,210	206	
Killam North	Blairmore	20	20/5	15	-	15	1,000	15	Supplies local utility.
	Blairmore Assoc.	5	20/5	4	-	4	1,000	4	
Knappen	Sunburst-Ellis	18	20/10	13	-	13	1,000	13	Gas sold to Canadian-Montana Gas Company Limited.
	Mississippian	7	10/10	6	-	6	1,000	6	
Kneller	Blairmore	15	10/5	13	-	13	1,100	14	Presently considered beyond economic reach.
Knopcik	Doe Creek	17	25/5	12	-	12	1,000	12	Supplies local utility.
	Paddy	1	20/15	1	-	1	1,020	1	
Lac La Biche	Blairmore	7	20/5	5	1	4	1,010	4	Supplies local utility.
Lambert Creek	Wabamun	15	25/10	10	-	10	1,050	11	Presently considered beyond economic reach.
Leahurst	Blairmore	37	15/5	30	2	28	1,160*	32	Supplies local utility.
Leduc-Woodbend	Cardium	12	20/5	9	4	5	1,040	5	Injected into Nisku and Leduc gas caps.
	Viking	20	20/5	15	3	12	1,070	13	
	Blairmore	21	15/5	17	14	3	1,180	4	
	Blairmore Assoc.	57	15/5	46	6	40	1,180	47	
	Wabamun Assoc.	3	15/10	2	1	1	1,050	1	
	Nisku Assoc.	37	10/15	28	-11	39	1,180	46	
	D-2 A Solution	130	25/30	70	59	11	1,180	13	Gas sold to North-western Utilities, Limited.
	Nisku Solution (Other)	42	25/30	22	15	7	1,180	8	
	D-3 A Assoc.	420	15/15	300	-22	322	1,180	380	
	Leduc Assoc. (Other)	6	15/15	4	1	3	1,180	4	
	D-3 A Solution	140	30/30	70	66	4	1,180	5	
	Leduc Solution (Other)	8	30/30	4	3	1	1,180	1	
Legal	Blairmore	6	25/5	4	2	2	1,030	2	Gas sold to Canadian Industrial Gas & Oil Ltd.
Lindbergh	Viking	3	35/5	2	-	2	990*	2	
	Blairmore	20	20/5	15	6	9	1,000*	9	Supplies salt plant.

TABLE A-1 (Cont'd)

(1) Field or Area	(2) Zone	(3) Initial Gas in Place Bcf	(4) Losses Reservoir/Surface Per Cent	(5) Initial Marketable Gas Bcf	(6) Marketable Gas Produced to May 31, 1967 Bcf	(7) Remaining Marketable Gas May 31, 1967 Bcf	(8) Estimated Heating Value Btu/cu ft	(9) Remaining Marketable Gas (1000 Btu Basis) Bcf	(10) Remarks
Little Bow	Mannville	19	15/5	16	-	16	1,000	16	
Lloydminster	Blairmore	24	15/30	14	11	3	950	3	Supplies local utility..
Lone Pine Creek	Blairmore	5	15/10	4	-	4	1,020	4	
	Wabamun A	280	15/20	190	-	190	1,030	196	
	Leduc Assoc.	63	15/25	40	-	40	1,060	42	
Long Coulee	Mannville	18	20/5	14	-	14	1,000	14	
Lookout Butte	Rundle A	620	15/15	450	-	450	1,040	468	Reservoir being cycled.
Lovett River	Blairmore	12	10/5	10	-	10	1,040	10	
	Rundle A	97	20/10	70	-	70	1,040	73	
Majeau Lake	Blairmore	3	20/5	2	-	2	1,000	2	Presently considered beyond economic reach.
	Mississippian	12	10/10	10	-	10	1,070	11	
Malmo	Viking	7	15/5	6	-	6	1,000	6	
	Blairmore	8	15/10	6	-	6	1,030	6	
	Blairmore Assoc.	2	30/15	1	-	1	1,030	1	
	Nisku Assoc.	5	20/20	3	-	3	1,100	3	
	Leduc	53	15/20	36	-	36	1,100	40	
	Leduc Assoc.	1	10/10	1	-	1	1,100	1	
Manyberries	Bow Island	34	20/5	26	21	5	940	5	Gas sold to Canadian-Montana Gas Company Limited.
Marlboro	Leduc	63	15/25	40	-	40	1,030	41	
Marsh Head Creek	Leduc	27	15/35	15	-	15	1,050	16	Presently considered beyond economic reach.
Marten Hills	Pelican	2	35/5	1	-	1	990	1	
	Grand Rapids	8	30/5	5	-	5	990	5	
	Wabiskaw A	560	25/5	400	-	400	990	396	
	Wabiskaw (Other)	13	25/5	9	-	9	990	9	
	Wabamun A	380	25/5	270	-	270	1,000	270	
	Wabamun (Other)	10	25/5	7	-	7	1,000	7	
Matziwin	Viking	11	15/5	9	-	9	1,000	9	
	Blairmore	1	25/5	1	-	1	1,010	1	
Mazeppa	Mississippian	20	10/15	15	-	15.	1,060	16	Presently considered beyond economic reach.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
McLEOD	BELLY RIVER	1	15/5	1	-	1	980	1	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	CADOMIN	7	25/10	5	-	5	980	5	
	JURASSIC	7	25/10	5	-	5	1,010	5	
MEDICINE HAT	MEDICINE HAT	2,370	20/5	1,800	446	1,354	970*	1,313	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED, MANY ISLANDS PIPE LINE LIMITED AND SUPPLIES LOCAL UTILITY.
	BOW ISLAND	14	25/5	10	1	9	970	9	
	SAWTOOTH	26	20/5	20	1	19	1,000	19	
MEDICINE RIVER	BLAIRMORE	140	15/10	110	-	110	1,150	127	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BLAIRMORE ASSOC.	28	20/5	21	-	21	1,150	24	
	BLAIRMORE SOLUTION	36	40/45	12	-	12	1,250	15	
	JURASSIC	14	20/5	11	-	11	1,020	11	
	JURASSIC ASSOC.	34	20/5	26	-	26	1,020	27	
	JURASSIC SOLUTION	73	35/45	26	-	26	1,100	29	
	MISSISSIPPIAN	15	15/5	12	-	12	1,100	13	
	MISSISSIPPIAN ASSOC.	11	20/5	7	-	7	1,100	8	
	MISSISSIPPIAN SOLUTION	30	40/45	10	-	10	1,200	12	
	LEDUC ASSOC.	5	10/20	4	-	4	1,100	4	
MILLET	BLAIRMORE	21	20/10	15	-	15	1,020	15	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
MINNEHIK-BUCK LAKE	BLAIRMORE	6	20/5	4	-	4	1,000	4	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	PEKISKO A	520	15/10	400	76	324	1.130	366	
	PEKISKO B	71	15/10	54	-	54	1,130	61	
MITSUE	GILWOOD ASSOC.	3	10/25	2	-	2	1,170	2	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	GILWOOD A SOLUTION	390	45/25	160	-	160	1,170	187	
MOOSE MOUNTAIN	MISSISSIPPIAN	75	20/25	45	-	45	1,000	45	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
MORINVILLE	VIKING	3	25/5	2	-	2	1,000	2	[illegible] CANADIAN GAS SOLD TO CANADIAN INDUSTRIAL GAS AND OIL LIMITED AND SUPPLIES LOCAL UTILITY.
	BLAIRMORE	140	20/10	99	41	58	1,070	62	
MOUNTAIN PARK	TRIASSIC	29	10/5	25	-	25	1,090	27	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
MURIEL LAKE	BLAIRMORE	9	25/5	6	1	5	1,000	5	SUPPLIES LOCAL UTILITY.
NEVIS	BLAIRMORE	61	15/10	50	-	50	1,000	50	
	DEVONIAN	1,120	15/15	810	137	673	1,000*	673	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
NEW NORWAY	VIKING	3	20/10	2	-	2	1,000	2	
	BLAIRMORE	11	10/5	9	-	9	1,010	9	
NIPISI	GILWOOD A SOLUTION	230	45/25	96	-	96	1,150	110	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
NITON	BASAL QUARTZ	13	20/5	10	-	10	1,070	11	
	CADOMIN	8	10/5	7	-	7	1,070	7	
NORDEGG	TRIASSIC	9	10/10	7	-	7	1,000	7	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MISSISSIPPIAN	25	10/10	20	-	20	1,000	20	
NORMANDVILLE	PEACE RIVER	1	20/5	1	-	1	990	1	
	GETHING	7	15/5	6	-	6	980	6	
	TRIASSIC	4	15/5	3	-	3	1,090	3	
	BELLOY	1	10/5	1	-	1	1,060	1	
	MISSISSIPPIAN	31	15/5	25	2	23	1,050	24	SUPPLIES LOCAL UTILITY.
OBED	BLAIRMORE	12	15/5	10	-	10	1,040	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MISSISSIPPIAN	4	15/10	3	-	3	1,050	3	
	NISKU	110	15/35	60	-	60	1,060	64	
OBERLIN	BLAIRMORE	3	20/5	2	2	<1	1,090*	<1	SUPPLIES LOCAL UTILITY.
OKOTOKS	CROSSFIELD	470	10/60	170	38	132	1,000	132	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
OLDS	WABAMUN A	490	15/25	310	27	283	1,050	297	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	WABAMUN (OTHER)	34	15/20	23	-	23	1,050	24	
OWLSEYE	BLAIRMORE	2	15/5	2	-	2	1,020	2	SUPPLIES LOCAL UTILITY.
OYEN	VIKING	43	15/5	35	7	28	980*	27	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	DETRITAL	11	15/5	9	1	8	1,010*	8	
PADDLE RIVER	JURASSIC-DETRITAL	190	25/10	130	6	124	1,070	133	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	MISSISSIPPIAN	40	25/10	27	-	27	1,060	29	
PAKOWKI LAKE	BOW ISLAND	16	35/5	10	7	3	940	3	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LIMITED.
PARKLAND	RUNDLE	3	15/15	2	2	0	1,010	0	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
PARKLAND NORTH-EAST	RUNDLE	21	15/15	15	-	15	1,010	15	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
PEMBINA	BELLY RIVER	57	20/5	43	2	41	1,180	48	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	BELLY RIVER ASSOC.	25	20/5	19	-	19	1,180	22	
	BELLY RIVER SOLUTION	100	55/80	9	-	9	1,180	11	
	CARDIUM SOLUTION	4,100	64/40	880	158	722	1,170	845	
	VIKING	11	20/5	8	-	8	1,100	9	
	GLAUCONITIC A	140	15/10	110	20	90	1,120	101	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	BLAIRMORE (OTHER)	120	15/5	96	5	91	1,120	102	
	JURASSIC	19	15/5	15	-	15	1,050	16	
	MISSISSIPPIAN	14	15/15	10	-	10	1,050	11	
PENDANT D'OREILLE	BOW ISLAND	210	20/5	160	91	69	940	65	GAS SOLD TO CANADIAN-MONTANA GAS COMPANY LIMITED.
	BASAL COLORADO	1	25/5	1	-	1	1,000	1	
	MANNVILLE	66	20/5	50	16	34	1,000	34	
PENHOLD	VIKING	14	10/5	12	-	12	1,020	12	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
PHIL CAN	GETHING	10	15/5	8	-	8	980	8	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MISSISSIPPIAN	5	15/5	4	-	4	1,050	4	
PINCHER CREEK	RUNDLE A	1,110	35/25	540	228	312	1,020*	318	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
PINE CREEK	WABAMUN	160	15/50	68	17	51	1,050*	54	GAS USED TO MAINTAIN PRESSURE IN WINDFALL FIELD.
	WABAMUN (OTHER)	66	15/50	28	-	28	1,050*	29	
	D-3	770	60/35	200	134	66	1,050*	69	
PINE NORTH-WEST	D-3 A	250	15/25	160	-	160	1,050	168	
PLAIN LAKE	VIKING	3	25/5	2	-	2	980	2	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	28	20/5	21	-	21	1,000	21	
PLOVER LAKE	VIKING	18	10/5	15	-	15	1,000	15	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
POUCE COUPE	PEACE RIVER A	150	30/5	100	80	20	1,000	20	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED.
	PEACE RIVER (OTHER)	3	20/5	2	-	2	1,000	2	
	CADOMIN	4	15/5	3	-	3	1,060	3	
POUCE COUPE SOUTH	DOE CREEK	5	40/5	3	2	1	1,000	1	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED AND PEACE RIVER TRANSMISSION COMPANY. LIMITED.
	PEACE RIVER	110	40/5	65	47	18	1,040	19	
	GETHING	16	20/5	12	11	1	1,000	1	
	CADOMIN	2	15/5	2	2	0	1,000	0	
	TRIASSIC	18	20/5	14	-	14	1,000	14	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
PREVO	BLAIRMORE	5	15/10	4	-	4	1,020	4	
	PEKISKO	44	15/10	34	6	28	1,110*	31	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
PRINCESS	SECOND WHITE SPECKS	60	30/5	40	4	36	970*	35	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BOW ISLAND	1	25/5	1	-	1	1,010	1	
	BASAL COLORADO	10	25/5	7	2	5	1,020*	5	
	BASAL COLORADO ASSOC.	18	25/5	13	-	13	1,020*	13	
	MANNVILLE	50	15/5	40	-	40	1,020*	41	
	MANNVILLE ASSOC.	36	20/5	27	21	6	1,020*	6	
	JEFFERSON	31	15/5	25	2	23	1,030*	24	
PROVOST	VIKING A & B	1,050	20/5	800	208	592	1,030*	610	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND SUPPLIES LOCAL UTILITY. INCLUDES AREA FORMERLY CALLED KESSLER.
	VIKING (OTHER)	5	20/5	4	-	4	1,030*	4	
	BLAIRMORE	24	15/5	19	-	19	1,000	19	
RAINBOW	SLAVE POINT	8	10/15	6	-	6	1,050	6	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	SULPHUR POINT	11	10/10	9	-	9	1,050	9	
	MUSKEG	8	10/20	6	-	6	1,120*	7	
	KEG RIVER	3	15/10	2	-	2	1,150*	2	
	KEG RIVER F ASSOC.	72	15/10	55	-	55	1,240*	68	
	KEG RIVER ASSOC. (OTHER)	41	15/10	31	-	31	1,240*	38	
	KEG RIVER A SOLUTION	110	15/20	77	-	77	1,260*	97	
	KEG RIVER F SOLUTION	140	15/20	97	-	97	1,260*	122	
	KEG RIVER SOLUTION (OTHER)	89	45/20	39	-	39	1,260*	49	
RAINBOW SOUTH	SULPHUR POINT	8	15/10	6	-	6	1,050	6	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MUSKEG	7	10/20	5	-	5	1,120*	6	
REDLAND	BELLY RIVER	1	35/5	1	-	1	1,000	1	
	VIKING	3	20/5	2	-	2	1,000	2	
	MANNVILLE	18	15/5	15	2	13	1,050	14	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
REDWATER	VIKING	27	25/5	19	1	18	1,040	19	SUPPLIES LOCAL UTILITY AND GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD.
	MANNVILLE	1	20/5	1	1	<1	1,050	<1	
	WABAMUN	4	15/5	3	2	1	1,070	1	
	LEDUC SOLUTION	230	40/65	49	11	38	1,220	47	
RED WILLOW	VIKING	13	20/5	10	-	10	1,020	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MANNVILLE	12	20/10	9	-	9	1,100	10	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
RETLAW	BOW ISLAND	3	25/5	2	-	2	950	2	
	BASAL COLORADO	8	25/5	6	-	6	1,020	6	
	MANNVILLE	69	20/10	50	4	46	1,000	46	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
RICH	MANNVILLE	16	15/10	12	1	11	1,100	12	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
RICHDALE	VIKING	14	25/5	10	-	10	1,010	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	MANNVILLE	11	25/5	8	-	8	1,050	8	
ROCHESTER	VIKING	4	20/5	3	-	3	1,000	3	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	25	25/5	18	-	18	1,000	18	
	WABAMUN	6	10/5	5	-	5	1,070	5	
ROWLEY	BELLY RIVER	6	20/5	4	-	4	1,000	4	
	VIKING	10	15/5	8	-	8	1,040	8	
	MANNVILLE	9	10/5	8	-	8	1,070	9	
	MANNVILLE ASSOC.	10	15/5	8	-	8	1,070	9	
	PEKISKO ASSOC.	47	10/10	38	-	38	1,080	41	
RYCROFT	GETHING	16	15/5	13	4	9	1,040	9	SUPPLIES LOCAL UTILITY.
SADDLE HILLS	PEACE RIVER	48	30/5	32	-	32	1,020	33	
	GETHING	5	20/5	4	-	4	980	4	
	PERMO-PENN	22	20/15	15	-	15	1,030	15	
SAMSON	BLAIRMORE ASSOC.	9	20/5	7	5**	3	1,040	3	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	BLAIRMORE SOLUTION	2	35/5	1					
SARCEE	RUNDLE A	210	15/15	150	34	116	1,050	122	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
SARCEE WEST	KOOTENAY	13	20/5	10	-	10	1,020	10	
SAVANNA CREEK	RUNDLE A	300	10/25	200	24	176	1,020	179	GAS SOLD TO WESTCOAST TRANSMISSION COMPANY LIMITED.
SEDALIA	VIKING A	79	20/5	60	5	55	1,010*	56	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	VIKING (OTHER)	53	20/5	40	-	40	1,010*	40	
	MANNVILLE	1	25/5	1	-	1	1,010	1	
SEDGEWICK	VIKING	3	25/5	2	-	2	1,000	2	
	BLAIRMORE	26	20/5	20	-	20	990	20	

TABLE A-1 (Cont'd)

(1) Field or Area	(2) Zone	(3) Initial Gas in Place Bcf	(4) Losses Reservoir/Surface Per Cent	(5) Initial Marketable Gas Bcf	(6) Marketable Gas Produced to May 31, 1967 Bcf	(7) Remaining Marketable Gas May 31, 1967 Bcf	(8) Estimated Heating Value Btu/cu ft	(9) Remaining Marketable Gas (1000 Btu Basis) Bcf	(10) Remarks
Seiu Lake	Viking	8	25/5	6	-	6	1,000	6	
	Mannville	28	20/5	21	-	21	1,000	21	
September Lake	Blairmore	11	25/5	8	-	8	1,030	8	Presently considered beyond economic reach.
	Blairmore Assoc.	1	25/5	1	-	1	1,030	1	
	Wabamun	1	25/5	1	-	1	940	1	
Sibbald	Viking	33	20/5	25	11	14	960*	13	Gas sold to Trans-Canada Pipe Lines Limited.
	Basal Colorado	13	20/5	10	-	10	970	10	
	Banff	1	20/5	1	-	1	1,050	1	
Simonette	Cadomin	12	15/5	10	-	10	1,060	11	
	Wabamun	60	15/35	33	-	33	1,070	35	
	D-3 Solution	270	45/40	89	-	89	1,020	91	
Smith Coulee	Bow Island	73	15/5	59	19	40	930	37	Gas sold to Canadian-Montana Gas Company Limited.
St. Albert-Big Lake	Viking	1	20/5	1	-	1	1,070*	1	
	Viking Assoc.	1	20/5	1	-	1	1,070*	1	
	Ostracod A	99	15/5	80	58	22	1,070*	24	Gas sold to Canadian Industrial Gas & Oil Ltd.
	Blairmore (Other)	50	15/5	40	-	40	1,070*	43	
Standard	Viking	26	20/5	20	-	20	1,000	20	
Steep Creek	Gething	6	15/5	5	-	5	1,020	5	Presently considered beyond economic reach.
	Triassic	9	15/10	7	-	7	1,030	7	
	Permo-Penn	15	10/10	12	-	12	1,030	12	
Stettler	Viking	3	25/5	2	-	2	1,020	2	Gas sold to Northwestern Utilities, Limited.
	Nisku Solution	25	60/90	1	-	1	1,130	1	
	Leduc Solution	36	45/95	1	-	1	1,140	1	
Stolberg	Rundle A	86	10/10	70	-	70	1,040	73	
St. Paul	Blairmore	5	20/5	4	4	<1	1,000	<1	Supplies local utility.
Strathmore	Belly River	14	20/5	11	2	9	1,000	9	Gas sold to Canadian Western Natural Gas Company Limited.
	Viking	9	20/5	7	-	7	1,000	7	
	Mississippian	1	20/5	1	-	1	1,000	1	
Sturgeon Lake	Gething	12	15/5	10	-	10	1,000	10	Presently considered beyond economic reach.
	Gilwood	1	25/5	1	-	1	1,100	1	
Sturgeon Lake South	Gething	43	15/5	35	-	35	1,000	35	
	Triassic Assoc.	2	10/5	2	-	2	1,180	2	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
Sturgeon Lake South (Cont'd)	Triassic Solution	15	35/70	3	-	3	1,180	4	
	Permo Penn	3	20/5	2	-	2	1,030	2	
	Wabamun	4	10/20	3	1	2	1,070	2	Gas sold to Canadian Utilities Limited.
	Leduc Assoc.	10	10/25	7	-	7	1,080	8	
	D-3 Solution	270	45/45	83	13	70	1,080	76	
Sundre	Viking	7	20/10	5	-	5	1,020	5	
	Blairmore	6	15/10	4	-	4	1,020	4	
	Blairmore Assoc.	10	10/10	8	-	8	1,020	8	
	Rundle Assoc.	21	15/15	15	-	15	1,070	16	
	Rundle Solution	75	55/35	22	-	22	1,100	24	
Sunnynook	Viking	4	25/5	3	-	3	1,010	3	
	Mannville	32	15/5	26	-	26	1,030	27	
Swalwell	Viking	4	20/5	3	-	3	1,000	3	
	Pekisko Assoc.	43	15/5	35	-	35	1,100	39	
Swan Hills	Gething	1	10/5	1	-	1	1,050	1	Gas sold to North-western Utilities, Limited.
	Beaverhill Lake A & B Solution	1,090	55/35	320	13	307	1,120 *	344	
Swan Hills South	Beaverhill Lake A & B Solution	570	55/30	180	8	172	1,120 *	193	Gas sold to North-western Utilities, Limited.
Sylvan Lake	Viking	4	15/5	3	-	3	1,010	3	
	Glauconitic A	210	15/10	160	16	144	1,100	158	Gas sold to Trans-Canada Pipe Lines Limited.
	Blairmore (Other)	140	15/10	110	13	97	1,100	107	
	Blairmore Assoc.	3	20/10	2	-	2	1,100	2	
	Detrital	10	20/10	7	-	7	1,100	8	
	Jurassic	22	15/10	17	-	17	1,020	17	
	Jurassic Assoc.	43	20/10	31	-	31	1,020	32	
	Jurassic Solution	23	40/45	8	-	8	1,100	9	
	Pekisko L	76	20/10	55	-	55	1,100	61	
	Mississippian (Other)	42	15/10	32	5	27	1,100	30	
	Mississippian Assoc.	13	20/10	9	-	9	1,100	10	
	Mississippian Solution	63	40/60	15	-	15	1,200	18	
	Leduc Assoc.	35	20/10	25	3**	27	1,020	28	
	Leduc Solution	15	35/45	5					
Taber South	Bow Island	17	30/5	11	-	11	1,000	11	Presently considered beyond economic reach.
Tangent	Cadotte	14	30/5	9	-	9	1,010	9	
	Gething A	76	20/5	58	-	58	1,000	58	
	Gething (Other)	3	20/5	2	-	2	1,000	2	
	Triassic	53	20/5	40	-	40	1,180	47	

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
TELFORDVILLE	MISSISSIPPIAN	12	15/10	9	-	9	1,110	10	
	WABAMUN	5	15/5	4	-	4	1,090	4	
THORHILD	BLAIRMORE	12	15/5	10	-	10	1,000	10	SUPPLIES VILLAGE OF THORHILD.
THREE HILLS CREEK	BELLY RIVER	9	15/5	7	-	7	970	7	
	VIKING	8	20/5	6	-	6	1,000	6	
	PEKISKO	210	10/10	170	17	153	1,110*	170	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	LEDUC	11	25/15	7	-	7	1,100	8	
TURIN	BOW ISLAND	14	20/5	10	-	10	970	10	
	MANNVILLE	35	10/5	30	-	30	1,020	31	
	ELLIS	5	15/5	4	-	4	1,070	4	
	MISSISSIPPIAN	4	10/10	3	-	3	1,050	3	
TURNER VALLEY	MISSISSIPPIAN	24	15/15	17	-	17	1,080	18	
	MISSISSIPPIAN ASSOC.	1,500	10/70	410	286	124	1,110	138	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED AND SUPPLIES LOCAL UTILITY.
	MISSISSIPPIAN SOLUTION	1,400	45/55	350	277	73	1,110	81	
TUTTLE	MANNVILLE	4	10/5	3	-	3	1,100	3	GAS SOLD TO CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
TWEEDIE	VIKING	11	25/5	8	-	8	1,000	8	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLAIRMORE	21	25/5	15	-	15	1,040	16	
TWINING NORTH	MANNVILLE	7	20/5	5	-	5	1,100	6	
	MISSISSIPPIAN	1	20/5	1	-	1	1,110	1	
	MISSISSIPPIAN ASSOC.	38	20/5	29	-	29	1,110	32	
	MISSISSIPPIAN SOLUTION	16	40/15	8	-	8	1,110	9	
TWO CREEK	TRIASSIC	12	10/5	10	-	10	1,090	10	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
USONA	BLAIRMORE	14	10/5	12	-	12	1,110	13	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
VERGER	BOW ISLAND	3	25/5	2	-	2	1,100	2	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
	BASAL COLORADO	7	20/5	5	1	4	1,060	4	
	MANNVILLE	74	15/5	60	3	57	1,050	60	
	MISSISSIPPIAN	3	15/10	2	-	2	1,070	2	
VIKING-KINSELLA	VIKING	950	15/5	770	407	363	1,000*	363	GAS SOLD TO NORTH-WESTERN UTILITIES,
	BASAL COLORADO	7	20/5	5	1	4	1,060	4	
	BLAIRMORE	80	20/5	61	14	47	1,000	47	

TABLE A-1 (CONT'D)

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
FIELD OR AREA	ZONE	INITIAL GAS IN PLACE BCF	LOSSES RESERVOIR/SURFACE PER CENT	INITIAL MARKETABLE GAS BCF	MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	REMAINING MARKETABLE GAS MAY 31, 1967 BCF	ESTIMATED HEATING VALUE BTU/CU FT	REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	REMARKS
VIKING-KINSELLA (CONT'D)	NISKU	15	20/5	13	5	8	990*	8	LIMITED AND SUPPLIES LOCAL UTILITY.
	LEDUC	1	15/5	1	-	1	990*	1	
VIRGINIA HILLS	BLAIRMORE	9	10/5	8	-	8	1,040	8	
	PERMIAN ASSOC.	20	15/10	15	-	15	1,160	17	
	BEAVERHILL LAKE SOLUTION	230	60/40	54	4	50	1,070*	54	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
	SLAVE POINT	3	20/20	2	-	2	1,070	2	
VULCAN	MANNVILLE	26	20/5	20	-	20	1,000	20	
	RUNDLE	23	20/20	15	-	15	1,010	15	
WAINWRIGHT	VIKING	5	20/5	4	-	4	980	4	
	BLAIRMORE	15	15/5	12	-	12	940	11	
	BLAIRMORE ASSOC.	10	20/5	8	-	8	940	8	
WASKAHIGAN	DUNVEGAN	66	20/5	50	-	50	1,100	55	
WATERTON	RUNDLE C	520	15/50	220	6	214	1,040*	222	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	RUNDLE D & E	450	15/50	190	33	157	1,040*	163	
	RUNDLE (OTHER)	15	15/30	9	4	5	1,040*	5	
	RUNDLE-WABAMUN A	1,510	15/30	900	102	798	1,040*	830	
	WABAMUN (OTHER)	140	20/15	93	10	83	1,020	85	
WATTS	VIKING	3	20/5	2	1	1	1,030*	1	SUPPLIES LOCAL UTILITY.
	MISSISSIPPIAN	1	20/5	1	-	1	1,070	1	
WAYNE-ROSEDALE	BELLY RIVER	8	20/5	6	-	6	1,000	6	
	VIKING A	160	15/5	130	23	107	1,090*	117	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED, CANADIAN WESTERN NATURAL GAS COMPANY LIMITED, AND SUPPLIES LOCAL UTILITY.
	VIKING (OTHER)	74	20/5	56	4	52	1,090*	57	
	GLAUCONITIC A	150	15/5	120	21	99	1,120	111	
	BLAIRMORE (OTHER)	72	15/5	58	9	49	1,120	55	
WEST DRUMHELLER	BLAIRMORE	4	15/5	3	-	3	1,100	3	
	RUNDLE	1	20/5	1	-	1	1,040	1	
	NISKU	9	10/15	7	-	7	1,090	8	
WESTEROSE	VIKING	3	20/5	2	-	2	1,000	2	
	BLAIRMORE	7	20/5	5	-	5	1,020	5	
	NISKU	1	10/5	1	-	1	1,050	1	
	D-3 ASSOC.	130	10/20	90	-7	97	1,070	104	
	D-3 SOLUTION	150	30/20	83	7	76	1,100	84	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.

TABLE A-1 (CONT'D)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE BCF	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(8) ESTIMATED HEATING VALUE BTU/CU FT	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF	(10) REMARKS
WESTEROSE SOUTH	WABAMUN	9	10/25	6	-	6	1,090	7	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED AND ALBERTA AND SOUTHERN GAS CO. LTD.
	D-3 A	1,630	10/15	1,250	320	930	1,020*	995	
WESTLOCK	VIKING	330	20/5	250	40	210	1,060	222	GAS SOLD TO CANADIAN INDUSTRIAL GAS & OIL LTD. AND SUPPLIES LOCAL UTILITY.
	BLAIRMORE	4	15/5	3	-	3	1,100*	3	
WEST PRAIRIE	CADOTTE	18	10/5	15	-	15	1,040	16	PRESENTLY CONSIDERED BEYOND ECONOMIC REACH.
	BLUESKY	6	10/5	5	-	5	990	5	
WHITELAW	BLUESKY	28	15/5	23	5	18	1,020	18	SUPPLIES LOCAL UTILITY.
	TRIASSIC	31	15/5	25	-	25	1,090	27	
WILDCAT HILLS	RUNDLE A	810	15/20	550	85	465	1,050*	488	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
WILDHORSE CREEK	MISSISSIPPIAN	150	15/20	100	-	100	940	94	
WILDMERE	BLAIRMORE	37	20/5	28	10	18	960*	17	GAS SOLD TO NORTH-WESTERN UTILITIES, LIMITED.
WILDUNN CREEK	VIKING	35	25/5	25	3	22	1,010	22	GAS SOLD TO TRANS-CANADA PIPE LINES LIMITED.
WILLESDEN GREEN	BELLY RIVER	13	20/5	10	-	10	1,000	10	GAS SOLD TO ALBERTA AND SOUTHERN GAS CO. LTD.
	CARDIUM	12	20/5	9	-	9	1,100	10	
	CARDIUM A SOLUTION	430	60/55	78	3	75	1,100	83	
	BLAIRMORE	29	15/10	22	-	22	1,100	24	
	BLAIRMORE ASSOC.	1	25/5	1	-	1	1,100	1	
	MISSISSIPPIAN	3	20/5	2	-	2	1,100	2	
WILLINGDON	VIKING	3	25/5	2	-	2	980	2	GAS SOLD TO WESTERN MINERALS LTD. AND SUPPLIES LOCAL UTILITY.
	MANNVILLE	17	25/5	12	2	10	990	10	
	LEDUC	12	20/5	9	7	2	1,000*	2	
WILSON CREEK	PEKISKO	51	15/10	39	-	39	1,090	43	
	BANFF	13	15/10	10	-	10	1,080	11	
WIMBORNE	VIKING	1	25/5	1	-	1	1,020	1	
	MISSISSIPPIAN	1	10/10	1	-	1	1,100	1	
	NISKU	1	15/15	1	-	1	1,160	1	

TABLE A-1 (Cont'd)

(1) FIELD OR AREA	(2) ZONE	(3) INITIAL GAS IN PLACE Bcf	(4) LOSSES RESERVOIR/SURFACE PER CENT	(5) INITIAL MARKETABLE GAS Bcf	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 Bcf	(7) REMAINING MARKETABLE GAS MAY 31, 1967 Bcf	(8) ESTIMATED HEATING VALUE Btu/cu ft	(9) REMAINING MARKETABLE GAS (1000 Btu BASIS) Bcf	(10) REMARKS
Wimborne (Cont'd)	Nisku Assoc.	1	20/15	1	-	1	1,160	1	
	D-3 A Assoc.	320	10/30	200	26**	224	1,000*	224	
	D-3 A Solution	110	35/30	50					Gas sold to Trans-Canada Pipe Lines Limited.
Windfall	Viking	17	25/5	12	-	12	1,030	12	
	Mississippian	5	15/5	4	2	2	1,040	2	Gas sold to Alberta and Southern Gas Co. Ltd. Pressure maintained by Pine Creek gas.
	Leduc	3	10/35	2	-	2	1,080*	2	
	D-3 A Assoc.	770	20/35	400	41**	469	1,080*	506	
	D-3 A Solution	240	30/35	110					
Winnifred	Bow Island	21	20/5	16	-	16	1,000	16	
Wintering Hills	Belly River	1	25/5	1	-	1	1,000	1	
	Viking	35	25/5	25	-	25	1,010	25	
	Viking Assoc.	10	25/5	7	-	7	1,010	7	
	Mannville	22	20/5	17	-	17	1,070	18	
	Mannville Assoc.	22	25/10	15	-	15	1,070	16	
	Mississippian	1	20/5	1	-	1	1,030	1	
Wizard Lake	Belly River	1	25/5	1	-	1	1,050	1	
	Viking	1	15/5	1	-	1	1,070	1	Gas sold to North-western Utilities, Limited.
	Blairmore	2	15/5	2	2	<1	1,120	<1	
	Blairmore Assoc.	12	20/15	8	8	<1	1,120	<1	
	D-3 A Solution	230	35/25	110	18	92	1,250	115	
Woking	Peace River	5	10/5	4	-	4	1,040	4	Supplies local utility.
	Spirit River	3	20/5	2	-	2	1,040	2	
	Bluesky	4	20/5	3	-	3	1,040	3	
	Permo-Penn	3	20/5	2	-	2	1,060	2	
	Kiskatinaw	3	25/5	2	-	2	1,070	2	
Wood River	Blairmore	46	20/10	33	7	26	1,090	28	Gas sold to Trans-Canada Pipe Lines Limited.
Worsley	D-3 B	89	15/5	72	14	58	1,070	62	Gas sold to Westcoast Transmission Company Limited. and supplies local utility
	D-3 G	66	15/5	53	17	36	1,070	39	
	Leduc (Other)	97	15/5	78	25	53	1,070	57	
	Leduc Assoc.	1	20/5	1	-	1	1,070	1	
Yekau Lake	Viking	3	20/5	2	2	<1	1,070	<1	Injected into Leduc-Woodbend.
	SUB TOTAL			44,860	6,697	38,163		40,585	
	OTHER RESERVES								
	Less than 10 Bcf			797	-	797		848	
	Confidential Pools			397	-	397		474	

TABLE A-1 (CONT'D)

	(5) INITIAL MARKETABLE GAS BCF	(6) MARKETABLE GAS PRODUCED TO MAY 31, 1967 BCF	(7) REMAINING MARKETABLE GAS MAY 31, 1967 BCF	(9) REMAINING MARKETABLE GAS (1000 BTU BASIS) BCF
TOTAL RESERVES, MAY 31, 1967	46,054	6,697	39,357	41,907
TOTAL RESERVES WITHIN ECONOMIC REACH	43,409	6,697	36,712	38,997
TOTAL RESERVES BEYOND ECONOMIC REACH	2,645	---	2,645	2,910

* MEASURED HIGHER HEATING VALUE
** INCLUDES SOLUTION GAS PRODUCTION

APPENDIX B

ALBERTA GAS REQUIREMENTS AND PRESENT PERMIT COMMITMENTS

Trans-Canada did not present its own forecast of Alberta's 30-year requirements, but rather relied upon updating the Board forecast published in OGCB Report 67-A(1) so that it would relate to the period January 1, 1967 to December 31, 1996. Alberta and Southern took a similar approach. However, its adjustment to the Board's forecast related to the period April 1, 1967 to March 31, 1997. The Utility Companies proposed no revision of their previous forecast, reviewed and summarized in OGCB Report 66-C(2), other than an adjustment to a level of 12.4 trillion cubic feet to make the forecast applicable to the same 30-year period used by Trans-Canada.

At the hearing the Board announced that the gas reserves of the Province would be assessed as at May 31, 1967. To conform with this date, the Board has decided to relate the requirements and permit commitments to the 30-year period June 1, 1967 to May 31, 1997.

The Board received submissions from Pacific Petroleums Ltd. concerning gas requirements for fuel and shrinkage at the Empress processing plant and from Trunk Line regarding its requirements. Subsequent to the hearing, the Board received a communication from Edmonton Liquid Gas Ltd. (Edmonton Liquid Gas) respecting gas requirements for its Steelman plant. In view of this new evidence, the Board believes it appropriate to revise its previous estimates of 'other' industrial requirements. This category comprises gas shrinkage and fuel requirements at the Empress and Steelman plants and requirements for Trunk Line.

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(1) Report on an Application of Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. January, 1967.

(2) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

Trunk Line's current estimates are considerably in excess of the Board's previous projection for the 30-year period 1967 to 1996 inclusive, as shown below:

	1967-1996 Bcf
Trunk Line Estimate	350
Board Estimate	194
Difference	156

Trunk Line's requirements comprise compressor fuel and unaccounted for losses. The difference between the two forecasts primarily relates to compressor fuel consumption. Trunk Line's forecast also includes amounts contingent upon the granting of the current applications. The Board accepts Trunk Line's revised projection of requirements.

The period for which Pacific Petroleums estimated requirements at the Empress plant commenced on July 1, 1967. Pacific Petroleums' original estimate was revised by the Board to relate to a commencement date of January 1, 1967. In contrast to the variation between Trunk Line's current estimates and the Board's, Pacific Petroleums' Empress plant requirements are considerably smaller than the Board's previous forecast. The amount is:

	1967-1996 Bcf
Board Estimate	504
Pacific Petroleums' Estimate	314
Difference	190

There is substantial agreement between the two estimates with regard to fuel requirements. The difference between the Board's figures and those of Pacific Petroleums is mainly a reflection of the smaller volumes attributed to shrinkage in Pacific's estimate. The Board believes Pacific Petroleums' estimates of shrinkage to be realistic, having regard to the introduction of propane recovery facilities at new plants and deeper cut facilities at existing plants. Therefore, the Board has adopted Pacific Petroleums' revised projection of requirements.

The estimates presented by Edmonton Liquid Gas subsequent to the hearing differ only marginally from the Board's prior projection. The Board has modified its estimate to reflect this minor difference.

Overall the net change to the Board's projection of 'other' industrial requirements for the period 1967-1996 inclusive is a reduction of 35 billion cubic feet.

A comparison of forecast requirements for 1966 with actual consumption for the domestic, commercial, basic and special industrial consumption categories did not indicate the desirability of a further adjustment to the Board's forecast. However, the Board is cognizant of the potential impact on gas consumption of recent developments in the fertilizer industry in the Province, and has had correspondence with companies involved in two recently announced projects: the construction by Imperial Oil Limited (Imperial) of a fertilizer plant at Redwater, and the expansion of the Western Co-Op Fertilizer Limited (Western Co-Op) plant at Calgary. In its current forecast the Board allowed for an expansion of Western Co-Op requirements in its 'special' industrial projection and for a development such as Imperial's at Redwater in its general contingency allowance. Nevertheless, the amounts of additional gas required by these developments may exceed the specific allowance in the current forecast by a significant margin.

The Board has also been in communication with Peace River Mining & Smelting Ltd. (Peace River). The Board's current forecast includes a contingency amount in excess of 1 trillion cubic feet relating to Peace River's proposed iron-ore smelting plant at Peace River. The Board has been informed that the earliest date anticipated for the commencement of operations has been further postponed to 1973. This date is itself predicated on the success of pilot operations and the market situation. The Board's current allowance is based on a date of inception of operations of 1970.

Having regard for the situation with respect to the Peace River scheme, its effect on the contingency allowance and the possibility of compensating differences in other sectors of the special industrial forecast, the Board does not believe it appropriate at this time to alter its industrial forecast to reflect increased fertilizer requirements. However, future reviews of the forecast will accord particular attention to this source of consumption.

Thus the Board forecast has been adjusted only for 'other' industrial requirements and for the revised 30-year period. The details are shown below:

	Bcf
Alberta requirements Jan. 1/66 to Dec. 31/95 as per Appendix C, OGCB Report 67-A	11,975
Plus estimated requirements for year 1996	580
Less estimated requirements for year 1966	-209
	12,346
Plus net change to other industrial forecast	-35
Alberta requirements Jan. 1/97 to Dec. 31/96	12,311
Less actual consumption Jan.-May, 1967, incl.	-107
Plus forecast consumption Jan.-May, 1997, incl.	240
Alberta requirements June 1/67 to May 31/97	12,444

Therefore, the Board estimates Alberta requirements for the 30-year period June 1, 1967 to May 31, 1997 to total some 12,444 billion cubic feet. The comparable figure forecast by the Utility Companies is some 13,124 billion cubic feet after the addition of the Board's 'other' industrial forecast, since the Utility Companies projection excludes this category of consumption.

Permit Commitments

The present permit commitments, the volume of gas removed to May 31, 1967 and the maximum daily authorized withdrawal rates, under authority of each of the 27 permits issued, are shown in Table B-2. At May 31, 1967 initial permit volumes totalled some 26 trillion cubic feet of gas. At this date, approximately 4 trillion cubic feet, or 15.4 per cent, of initial permit volumes have been removed from the Province.

The principal adjustments in permit commitments from the level shown in Table C-2 of OGCB Report 67-A relate to the volumes authorized for removal from the Province by Alberta and Southern. These adjustments are contained in Permit No. AS 67-4, issued at February 21, 1967 and the amendments to Permit No. AS 64-3 issued at February 21 and June 13, 1967.

TABLE B-1

SUMMARY OF FORECASTS OF ALBERTA GAS REQUIREMENTS FOR PERIOD JANUARY 1, 1967 TO DECEMBER 31, 1996

(Billions of Cubic Feet of 1,000 Btu Gas)

	Utility Companies 1966*	Board Staff	Board 1966
Domestic			
1967 Annual	52.5	52.0	52.0
1996 Annual	110.5	120.4	120.4
30-Year Total	2,390	2,518	2,518
Commercial			
1967 Annual	41.1	40.5	40.8
1996 Annual	88.8	100.4	94.6
30-Year Total	1,914	2,049	1,982
Industrial			
1967 Annual	119.1	121.6	121.6
1996 Annual	418.4	339.2	339.2
30-Year Total	8,770	7,811	7,811
Total			
1967 Annual	212.7	214.1	214.4
1996 Annual	617.7	561.2	554.2
30-Year Total	13,074	12,378	12,311
Equivalent Average Annual Growth Rate to Achieve Terminal Year (%)	3.7	3.4	3.2
Equivalent Average Annual Growth Rate to Achieve 30-Year Total (%)	4.5	4.2	4.1

*Industrial and Total numbers adjusted to include Board's revised estimate of 'other' industrial consumption.

TABLE B-2

PERMIT COMMITMENTS

(ALL VOLUMES AT 14.65 PSIA AND 60^{0}F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS			WITHDRAWN TO MAY 31, 1967 BCF	REMAINING AUTHORIZED WITHDRAWAL BCF
		MAXIMUM DAY MMCF	MAXIMUM ANNUAL BCF	TOTAL BCF		
AS 64-3	ALBERTA AND SOUTHERN GAS CO. LTD.					
	BIGSTONE, BRAZEAU RIVER, CAROLINE, CARSON CREEK, CARSON CREEK NORTH, CROSSFIELD (RUNDLE POOL), FERRIER (VIKING A AND CARDIUM B POOLS), HARMATTAN-ELKTON (D-3 A POOL), HOMEGLEN-RIMBEY, KAYBOB, MALBORO, MINNEHIK-BUCK LAKE, PEMBINA (LOBSTICK GLAUCONITIC AND LOBSTICK OSTRACOD POOLS), PINE CREEK, PINE NORTH-WEST, SUNDRE, SYLVAN LAKE, WATERTON, WESTEROSE SOUTH, WESTWARD HO, WILDCAT HILLS, WILLESDEN GREEN, WILSON CREEK, WINDFALL, JUDY CREEK, SWAN HILLS, SWAN HILLS SOUTH, VIRGINIA HILLS.	875.0	287.0	6,930.0	871.7	6,058.3
AS 67-4	ALBERTA AND SOUTHERN GAS CO. LTD.					
	BELLOY, BERLAND RIVER, EAGLESHAM, FOX CREEK, GOLD CREEK, HUNTER VALLEY, KAYBOB SOUTH, PEMBINA (PEKISKO B POOL), TANGENT, WASKAHIGAN, WILDHORSE CREEK.	150.0	49.0	1,200.0	-	1,200.0
CD 63-1	CANADIAN DELHI OIL LTD. - MEDICINE HAT	4.3	1.57	32.3	2.7	29.6
CM 54-1	CANADIAN-MONTANA PIPELINE COMPANY					
	ADEN, BLACK BUTTE, COMREY, KNAPPEN, MANYBERRIES, PAKOWKI LAKE, PENDANT D'OREILLE, SMITH COULEE.	100.0	40.0	459(1)	215.8	243.2

(1) TOTAL INITIAL MARKETABLE GAS IN THE FIELDS SHOWN.

TABLE B-2 (CONTINUED)

PERMIT COMMITMENTS

(ALL VOLUMES AT 14.65 PSIA AND 60^{0}F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT		PERMITTED WITHDRAWALS			WITHDRAWN TO MAY 31, 1967 BCF	REMAINING AUTHORIZED WITHDRAWAL BCF
			MAXIMUM DAY MMCF	MAXIMUM ANNUAL BCF	TOTAL BCF		
CP 63-1	CANADIAN PACIFIC OIL AND GAS LIMITED	– MEDICINE HAT	0.1	0.0365	0.750	0.1	0.7
BH 61-1	DELTA GAS & TRANSMISSION LTD.	MEDICINE HAT	9.5	3.5	71.0	–	71.0
BS 61-1	BAILEY SELBURN OIL AND GAS LTD.						
CS 61-1	THE CALIFORNIA STANDARD COMPANY						
COG 61-1	CHARTER OIL AND GAS LTD.						
SEL 61-1	SELBAY EXPLORATION LTD.						
JMW 61-1	J. MERRIL WRIGHT, JR.						
CEL 61-1	CROWFOOT EXPLORATION LTD.						
CMM 61-1	J. RAY McDERMOTT & CO. LTD.	MEDICINE HAT	8.3	3.0	62.0	6.6	55.4
MOG 61-1	MAYFAIR OIL & GAS (1961) LTD.						
ROC 61-1	RICHFIELD OIL CORPORATION						
ROC 65-2	RICHFIELD OIL CORPORATION	– MEDICINE HAT	0.26	0.088	2.0	0.1	1.9
HB 63-1	HUDSON'S BAY OIL AND GAS COMPANY LIMITED	– MEDICINE HAT	1.02	0.372	7.65	0.4	7.3
SPC 57-1	MANY ISLANDS PIPE LINES LTD.	– MEDICINE HAT	135.5	44.5	609.4	143.0	466.4
MO 66-1	MURPHY OIL COMPANY LTD.	– RED COULEE	0.6	–	0.5	–	.5
NSU 64-1	THE BRITISH AMERICAN OIL COMPANY LIMITED	– ANTELOPE AND ESTHER	11.4	4.2	40.0	6.6	33.4
	ROYALITE OIL COMPANY LIMITED						
	SUN OIL COMPANY						
	UNITED CANSO OIL & GAS LTD.						

TABLE B-2 (continued)

PERMIT COMMITMENTS

(All Volumes at 14.65 Psia and 60°F)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS MAXIMUM DAY MMcf	PERMITTED WITHDRAWALS MAXIMUM ANNUAL Bcf	PERMITTED WITHDRAWALS TOTAL Bcf	WITHDRAWN TO MAY 31, 1967 Bcf	REMAINING AUTHORIZED WITHDRAWAL Bcf
	PEACE RIVER TRANSMISSION COMPANY LIMITED – Pouce Coupe	6.0	0.6	13.0	12.5	20.2
	PEACE RIVER TRANSMISSION COMPANY LIMITED – Pouce Coupe South	6.9	0.98	19.7		
B 64-1	PATRICK T. BUCKLEY – Vanalta No. 4 Well	1.3 MMcf Per Month	0.01	-	0.1	-
PG 64-1	PROVO GAS PRODUCERS LIMITED – Halliday, Richdale and Wildunn Creek	10.0	3.6	45.0	3.7	41.3
TC 64-6	TRANS-CANADA PIPE LINES LIMITED					
	Abee, Alderson, (2WS A, 2wS B and Bow Island A Pools), Atlee-Buffalo, Baptiste, Bashaw, Bellis, Bindloss, Boyle, Calling Lake, Caroline (Viking A, Viking D, Viking E and Basal Mannville A Pools), Carstairs, Cessford, Chigwell, Connorsville, Countess, Craigend, Crossfield, Crossfield East, Drumheller, Edson, Enchant, Equity, Erskine, Fenn-Big Valley, Fenn-West, Figure Lake, Francis, Garrington (Viking A, Viking B, Mannville A and Leduc A Pools), Ghost Pine, Gilby, Hackett, Hamilton Lake, Harmattan East, Harmattan-Elkton (Rundle A Pool), Homeglen-Rimbey, Hussar, Innisfail, Kessler, Little Bow, Lone Pine Creek, Long Coulee, Malmo (Leduc B Pool), Marten Hills, Medicine Hat, Medicine River, Minnehik-Buck Lake, Nevis, Olds, Oyen, Pincher Creek, Prevo, Princess, Provost, Retlaw, Rich, Rowley, Sedalia, Seiu Lake, Sibbald, Standard, Stettler, Sundre (Viking A, Basal Mannville A and Basal Mannville B Pools), Sunnynook, Swalwell, Sylvan Lake,	1,995.0	665.0	15,000.0	2,261.2	12,738.8

TABLE B-2 (continued)

PERMIT COMMITMENTS

(All Volumes At 14.65 Psia and $60^{\circ}F$)

PERMIT NUMBER	PERMITTEE AND FIELDS UNDER PERMIT	PERMITTED WITHDRAWALS			WITHDRAWN TO MAY 31, 1967	REMAINING AUTHORIZED WITHDRAWAL
		MAXIMUM DAY MMcf	MAXIMUM ANNUAL Bcf	TOTAL Bcf	Bcf	Bcf
	Thorhild, Three Hills Creek, Trochu, Verger, Vulcan, Wayne-Rosedale, Westerose, Westerose South, Wimborne, Wintering Hills and Wood River.					
WC 52-1	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.					
	Braeburn, Gordondale, Pouce Coupe, Pouce Coupe South	125.0	35.0	388.0	211.6	176.4
WC 59-3	WESTCOAST TRANSMISSION COMPANY LTD.					
	Savanna Creek, Crossfield (Calgary Basal Quartz, Calgary Rundle, and Calgary Wabamun Pools)	162.2	53.1	1,081.2	233.5	847.7
WC 61-4	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LIMITED					
	Boundary Lake South	Volumes Not To Exceed Those Authorized In Permit No. WC 52-1				
WC 62-5	WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD.					
	Worsley	53.3	16.0	220.0	56.1	163.9
		3,654.42	1,207.5565	26,181.50	4,025.70	22,156.00

APPENDIX C

THE MEETING OF ALBERTA'S REQUIREMENTS FOR GAS AND THE PRESENT PERMIT COMMITMENTS, AND THE RESULTING SURPLUS

(1) Views of Trans-Canada

Trans-Canada submitted that the contractable gas reserves at December 31, 1966, exceeded the contractable requirements by 4.0 trillion cubic feet. It presented a detailed table, included here as Table C-5, whereby it determined that the future deficiency at December 31, 1966, would be 0.7 trillion cubic feet and that an overall surplus of 3.3 trillion cubic feet would result after taking account of the contractable surplus of 4.0 trillion cubic feet. It determined the quantities entered in the table in a manner similar to that followed by the Board and any differences in interpretation are principally the result of differences in the interpretation or categorization of reserves and the date of analysis. It submitted that the additional 2.1 trillion cubic feet of gas it is seeking authorization to remove from the Province is surplus to the present and future needs of persons within the Province.

At the hearing, Trans-Canada emphasized that it had little information on the recent discoveries, particularly in the Bistcho-Zama Lake area, where information is being kept confidential. On this basis, it considered its estimate of the volume of gas which is surplus to the requirements of the Province and existing permit commitments was conservative.

(2) Views of Alberta and Southern

Alberta and Southern stated it had reviewed the reserves of gas in some of the fields where gas is under contract to it and found that the reserves in the fields it reviewed had increased by 0.6 trillion cubic feet on a 1,000 Btu basis. It submitted that this increase would accommodate the increase in Alberta requirements in the 30-year period beginning March 31, 1967, and will result in an overall surplus of 0.3 trillion cubic feet after release of reserves required to protect the peak day in permits. It added that this increase of 0.3 trillion cubic feet is greater than the 0.16 trillion cubic feet required for the permit amendment for which it applied. Alberta and Southern added it was confident that, after considering revisions to the reserves of all fields, the Board would find a surplus much greater than Alberta and Southern had found after reviewing only some of the fields.

(3) Views of Interveners

Canadian Western Natural Gas Company Limited and Northwestern Utilities, Limited. The Utility Companies submitted that, if the Board satisfied itself as to the existence of adequate contractable and future surpluses, they would have no objections to approval of the removal from the Province of the additional quantities applied for by the applicants.

Alberta Division of the Canadian Petroleum Association. CPA, like Trans-Canada, presented a detailed table whereby it determined the gas surplus to Alberta requirements and permit commitments as of December 31, 1966, using the calculation method currently used by the Board. The CPA table is included here as Table C-6.

CPA calculates the contractable surplus to be 4.8 trillion cubic feet, the future deficiency to be 1.0 trillion cubic feet, and the overall surplus after release of reserves required to protect peak day requirements in certain permits to be 4.6 trillion cubic feet.

It will be noted that CPA interprets Alberta requirements for delivery during the 30-year period to be 12.4 trillion cubic feet, the gas reserves from two years' trends to be 5.7 trillion cubic feet, and the contractable reserves to be 39.5 trillion cubic feet after allowing for shrinkage at the Empress plant. The trend gas estimate was obtained by tabulating CPA's present estimates of probable gas reserves by year of discovery, determining the average increase per year of the essentially fully appreciated reserves (between 1954 and 1962), converting the resulting increase per year to a 1,000 Btu basis, and multiplying by two. Other quantities in the table have been determined using procedures similar to those used by the Board.

CPA stated it believes that the additional experience in both the amount of appreciation and in the rate of discovery since 1959, when the Board first incorporated an allowance for trend gas in surplus calculations, warrants a larger allowance for trend gas in the surplus calculations than heretofore included. In its view, the very minimum amount of trend gas allowed on this basis should be five times the average annual trend. It added that, if five years of trend gas were used in CPA's calculation, the calculated surplus would be increased by 8.5 trillion cubic feet over that shown in the table.

The Meeting of Alberta's Long Term Requirements (June 1, 1967 to May 31, 1997)

As discussed in Appendix B, the 30-year gas requirements of the markets within the Province (Alberta requirements) have been estimated at some 12.4 trillion cubic feet with a peak day requirement in the thirtieth year of some 2.7 billion cubic feet. The fields now connected to and supplying Alberta's requirements, together with their remaining reserves as of May 31, 1967, which total 6.5 trillion cubic feet, are shown in Table C-1. Thirty times the requirements of the first year of the period is 6.4 trillion cubic feet. The contractable requirements, defined under the Board's policy set forth in OGCB Report 66-C(1) as the greater of 30 times the requirements of the first year of the period under consideration or the remaining reserves in those fields connected to and supplying Alberta requirements, are therefore 6.5 trillion cubic feet.

Table C-1 shows also the Board's interpretation of the reserve-delivery ratio of each of the fields and the average reserve-delivery ratio of the group of fields supplying Alberta requirements. The reserves are classified in the table between major reserves, oil field gas and small reserves plus reserves supplying small utilities. A detailed review of the ratios has been made prior to preparation of this report. The reserve-delivery ratio is the initial gas in place adjusted for surface losses divided by the initial fully developed marketable gas deliverability.

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(1) Report on an Application of Trans-Canada Pipe Lines Limited under The Gas Resources Preservation Act, 1956. June, 1966.

The Board estimates that, of the total of some 6,500 billion cubic feet of gas tabulated in Table C-1, some 4,900 billion cubic feet will be produced during the 30-year period and the remaining unproduced reserve will be capable of sustaining a peak day delivery of some 500 million cubic feet in the thirtieth year. Therefore, total deliveries of about 7,500 billion cubic feet (12,400 - 4,900 = 7,500) and a thirtieth year peak day delivery of about 2,200 million cubic feet (2,700 - 500 = 2,200) will be required from other sources.

The actual quantities of gas necessary to provide these deliveries may be calculated using the formula method presented in Appendix E of OGCB Report 64-11(2). With respect to the factors to be used in the formula, the Board believes that, since this gas must come in part from established gas reserves not now connected to local utilities nor authorized for removal from the Province and in part from gas reserves not yet developed, the factors should reflect the delivery characteristics of both of these sources of gas.

The Board has made a comprehensive review of the average reserve-delivery ratio since the issuance of OGCB Report 67-A(3). The review consisted of detailed assessments of the reserve-delivery ratios of the pools supplying Alberta requirements, included in permits, applied for in the applications considered in this report or included in the remaining reserves. The average reserve-delivery ratio was found to be 1.9 as shown in Table C-2. The average reserve-delivery ratio utilized in recent previous reports was 2.4. The reduction in the ratio is largely the result of improved well stimulation and completion practices. When the Board last reviewed the average ratio in detail, many of the pools had not been produced or had been produced only briefly and the well capability was not fully exploited.

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(2) Report on the Applications of Trans-Canada Pipe Lines Limited and Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. November, 1964.

(3) Report on an Application of Alberta and Southern Gas Co. Ltd. under The Gas Resources Preservation Act, 1956. January, 1967.

In determining the reserve-delivery ratio of a pool, the ultimate number of wells which will be drilled in the pool must be estimated as well as the deliverability of each of these wells. This introduces some uncertainty into the calculation. Accordingly, the Board has rounded the ratio of 1.9 to 2.0 for estimating the reserves needed to provide sufficient deliverability to meet Alberta requirements in the thirtieth year. The effect of the revision of the reserve-delivery ratio from 2.4 to 2.0 is to reduce the amount of gas required from additional sources to protect the thirtieth year peak day requirements from 4,600 to 3,600 billion cubic feet.

The effect on the average reservoir recovery factor of changes in reserves which have occurred since the last report has been assessed, and the changes were found to be insufficient to alter the 0.84 value previously determined. The total marketable gas needed to meet Alberta's 30-year requirements, as calculated by the formula method, is determined as follows, with all quantities shown being in billions of cubic feet.

From now connected sources for delivery during the period	4,900	
From additional sources for delivery during the period	7,500	
Total Alberta Requirements for delivery		12,400
From now connected sources to protect the thirtieth year peak(1)	1,600	
From additional sources to protect the thirtieth year peak(2)	3,600	
Total Alberta Requirements for peak day protection		5,200
Total Alberta Requirements		17,600

(1) i.e. 6,500 - 4,900 = 1,600

(2) Determined as $R_p = 1.3\ FP_n - (1 - K)\ (1.3\ FP_n + A_1 s)$

$$= 1.3\ (2.0)\ (2{,}200) - (1 - 0.84)$$

$$1.3\ (2.0)\ (2{,}200) + 7{,}500$$

$$= 5{,}720 - 2{,}115 = 3{,}605, \text{ say } 3{,}600$$

The Remaining Permit Commitments

The permit commitments remaining at May 31, 1967, are shown in Appendix B to be some 22.2 trillion cubic feet before adjustments for heating value.

The fields included in each of the permits are shown in Table C-3. The table also shows the Board's current estimate of the remaining reserves of marketable gas and the ratio of initial marketable gas in place to delivery capacity for each field. The table reflects changes in the remaining marketable reserves which have occurred since the preparation of OGCB Report 67-A. It also incorporates revisions to reserve-delivery ratios resulting from a restudy of the pool deliverability in relation to the reserves.

In comparing the figures and fields listed under each permit, it will be noted that changes have occurred principally as a result of the coalescence of pools and fields such as the coalescence of the Provost and Kessler fields.

Alberta and Southern, by Permit No. AS 67-4, is permitted to remove 170 billion cubic feet of gas from the Judy Creek, Swan Hills, Swan Hills South and Virginia Hills Fields. This gas would be processed by the gas processing facilities at Judy Creek operated by Imperial Oil Limited under schemes, one subject to Gas Utilities Board Approval No. 1 and the other to a Board approval. Under the Gas Utilities Board approval, Imperial Oil Limited is required to sell prescribed quantities of gas to Northwestern Utilities, Limited each year up to and including the year 1972. After 1972, the quantities of gas to be sold to Northwestern Utilities, Limited shall be such quantities as are agreed to by it and Imperial Oil Limited or, if agreement is not reached, such quantities as the Gas Utilities Board following a hearing may prescribe. The volume in the permit fields shown in Table C-4 includes the 170 billion cubic feet, since it appears that Imperial Oil Limited will be able to meet the requirements of Northwestern and still have sufficient deliverability to provide the amount of gas in the fields under contract to Alberta and Southern during the term of Permit No. AS 67-4.

In Table C-3, the remaining reserves of the Crossfield Field, for which the three major permit holders, Alberta and Southern, Trans-Canada and Westcoast, have permits, have been apportioned among them on the basis of the Board's knowledge of their contracts.

The entire remaining reserves which the Board attributes in Table A-1 to the Crossfield Rundle A Pool have been shown as named in the permit of Alberta and Southern since the Board believes it to be the only permittee with contracts for gas reserves in the pool. However, the reserves attributed in Table A-1 to the Crossfield Blairmore pools, Crossfield Wabamun A Pool and the Crossfield Elkton B Pool, where both Trans-Canada and Westcoast have gas under contract, are apportioned between these permittees in Table C-3. Westcoast has contracted for 1.0 trillion cubic feet of the gas processed by the Petrogas Processing Ltd. facility and has first right to all deliverability until its contract volume is produced. Trans-Canada has the next 300 billion cubic feet of gas under contract subject to the Westcoast preference on deliverability and Trans-Canada has been assigned this portion of the reserves in Column 4 of Table C-4. Divisions of reserves between permittees or between permittees and provincial requirements have also been made for the Homeglen-Rimbey, Pembina, Sylvan Lake, Westerose South, Wayne-Rosedale and Medicine Hat fields as well as a number of other smaller fields.

The results of the Board analysis with respect to the meeting of the remaining permit commitments are shown in Table C-4. Columns 1 and 2 show respectively the remaining permit commitment and the maximum daily withdrawal authorized in each of the permits. These figures were obtained from Appendix B and have been converted to the basis of 1,000 Btu per cubic foot. The expiry date of each of the permits is shown in Column 3. Columns 4 and 5 present, where applicable, the Board's current estimate of the total remaining marketable reserves and the reserve-delivery ratio (both from Table C-3) of the fields included in each permit. Column 6 shows the composite correction factor for each of the permittees' systems for which peak load protection is provided, as determined from the illustrative deliverability schedules prepared prior to the release of the Board's OGCB Report 64-11. (The Board believes that insufficient changes have occurred in the fields supplying each of the permits to warrant a detailed restudy and redetermination of the composite correction factor.) The estimated quantity of marketable gas in place required to meet the peak day commitment in the terminal year of each permit is shown where applicable in Column 7. Column 8 shows the marketable gas equivalent of Column 7. These values were obtained by deducting from Column 7 the marketable gas equivalent of the gas that will remain in the reservoirs at abandonment. The total marketable gas required to meet the permit requirements, both deliveries and peak day, is shown in Column 9. Columns 10 and 11 present the Board's estimate of the marketable gas in the fields in the permit excess to the permit commitments before and after the expiry date of each permit.

In the case of permits where the removal of all the reserves in the permit fields has been authorized or where no allowance for maximum day protection has been made by the Board, entries in Columns 5 through 8, which support the calculation of marketable reserves required to meet the terminal year peak day, have been omitted.

The remaining commitment of the Westcoast Peace River permit provides for an adjustment described more fully in OGCB Report 66-C and in Permit No. WC 62-5 related to the delivery of gas from the Worsley Field and the meeting of future requirements of an iron ore processing industry in the Peace River area. The provision for this market in the estimated Alberta requirements is discussed in Appendix B.

Table C-4 shows that a total marketable gas reserve of 24.3 trillion cubic feet is required to meet the commitment of all existing permits of 23.5 trillion cubic feet. Since reserves of 25.9 trillion cubic feet are available, a surplus of 1.6 trillion cubic feet of gas exists in the fields named in the permits. After the expiry dates of the permits, several years before the end of the 30-year period, an additional 800 billion cubic feet, the amount allowed to meet the terminal year peak day deliveries for certain of the permits, will become excess to the existing permit commitments.

The Gas Surplus to Alberta's Requirements and the Permit Commitments

The surplus calculation, using the method adopted by the Board which has been discussed in detail in OGCB Report 66-C under the title of the Board Modified Method, is illustrated in Table C-7.

Table C-7 shows that the Board's estimate of contractable reserves, the reserves within economic reach (39.0 trillion cubic feet) less the deferred reserves (4.9 trillion cubic feet), totals some 34.1 trillion cubic feet. The deferred reserves are interpreted in Table C-8 as consisting of some 4.3 trillion cubic feet expected to be marketable within 30 years and 0.6 trillion cubic feet which the Board estimates will be deferred beyond the 30-year period. The contractable requirements include the 6.5 trillion cubic feet now connected to supply Alberta's requirements and 23.5 trillion cubic feet to meet the permit commitments. A comparison of the contractable reserves and contractable requirements results in a contractable surplus of 3.3 trillion cubic feet.

The table also shows that the remaining Alberta requirements total some 11.1 trillion cubic feet. These are made up of some 7.5 trillion cubic feet which the Board believes will have to be delivered during the 30-year period and some 3.6 trillion cubic feet which the Board estimates will be necessary to provide for the thirtieth year peak day.

The remaining and future reserves available to meet these Alberta requirements are shown to total some 11.1 trillion cubic feet. These are made up of 4.3 trillion cubic feet of deferred gas which the Board believes will be produced within the 30-year period, some 1.8 trillion cubic feet of reserves now beyond economic reach but which the Board believes will be within economic reach within 30 years, and 5.0 trillion cubic feet of future reserves reflecting two years growth at the average long term growth rate. (In this instance the growth rate over the last two years is higher than the long term growth rate.) The 1.8 trillion cubic feet of reserves now beyond economic reach but expected to be available within 30 years was obtained by subtracting 571 billion cubic feet of reserves in the Rainbow area from the total reserves beyond economic reach (2.9 trillion cubic feet) and taking 75 per cent of the remainder. The reserves in the Rainbow area are either associated with oil reserves or are expected to be required for enhanced oil recovery schemes and will not be available within 30 years. The total remaining requirements are thus equal to the total remaining and future reserves; hence there is no future surplus, before consideration of the contractable surplus. The procedure by which these figures are determined is outlined in detail in OGCB Report 66-C.

The overall surplus from addition of the contractable surplus of 3.3 trillion cubic feet and the nil future surplus is 3.3 trillion cubic feet. This overall surplus will increase to 4.1 trillion cubic feet after release, at the end of the term of the permits, of the 0.8 trillion cubic feet allocated to protect peak day requirements in certain permits.

TABLE C-1

RESERVES AND RESERVE-DELIVERY RATIOS OF FIELDS SUPPLYING ALBERTA'S REQUIREMENTS FOR GAS

(All Volumes At 1000 Btu Per Cubic Foot)

Field	Marketable Gas at May 31, 1967 Bcf	Reserve-Delivery (1 Ratio Bcf/MMcfd
Major Reserves		
Beaverhill Lake - Fort Saskatchewan	422	0.8
Bow Island	20	0.9
Carbon	125	0.8
Fairydell-Bon Accord	78	0.7
Foremost	18	0.8
Judy Creek	40	0.8
Jumping Pound	333	3.7
Jumping Pound West	735	8.6
Medicine Hat	228	5.8
Morinville	64	1.6
Okotoks	132	3.6
Paddle River	162	1.4
Sarcee	122	1.5
St. Albert-Big Lake	69	1.8
Turner Valley	237	4.2
Viking-Kinsella	419	1.7
Wayne-Rosedale	147	1.1
Westlock	225	1.3
Worsley	150	0.4
TOTAL	3726	
WEIGHTED AVERAGE		1.7
Oil Field Gas		
Acheson	21	10.2
Bonnie Glen	288	29.0
Campbell-Namao	9	2.2
Fenn-Big Valley	11	20.8

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(1) The initial gas in place adjusted for surface losses divided by the initial fully developed marketable gas deliverability.

TABLE C-1 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
Oil Field Gas (Continued)		
Glen Park	10	28.0
Judy Creek	214	38.2
Leduc-Woodbend	27	4.9
Pembina	856	37.7
Redwater	47	25.8
Samson	3	3.8
Simonette	91	27.0
Stettler	2	6.0
Sturgeon Lake South	76	24.8
Swan Hills	276	41.7
Swan Hills South	155	40.5
Virginia Hills	43	38.0
Wizard Lake	115	30.9
TOTAL	2244	
WEIGHTED AVERAGE		25.6
Small Reserves Plus Reserves Supplying Small Utilities		
Acheson	20	0.9
Alderson	17	4.9
Alexander	7	0.4
Athabasca	6	1.5
Athabasca East	2	0.4
Atim	2	0.2
Bantry	33	26.0
Beaver Crossing	1	0.6
Bonnie Glen	1	1.0
Bonnyville	2	0.1
Brooks	3	9.5
Calais	18	0.9
Castor	8	0.3
Charlotte Lake	1	0.1
Cold Lake	2	0.4

(Continued)

TABLE C-1 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
SMALL RESERVES PLUS RESERVES SUPPLYING SMALL UTILITIES (CONT'D)		
CRAIG LAKE	1	0.3
DOWLING LAKE	3	0.3
DUVERNAY	1	0.6
EDWAND	3	0.1
ELK POINT	1	1.0
ELLERSLIE	1	0.1
ETZIKOM	27	1.2
EXCELSIOR	4	1.1
FORT KENT	3	0.1
GLEN PARK	3	1.0
HAIRY HILL	13	0.6
HAMELIN CREEK	13	0.6
HANNA	11	2.5
HEART RIVER	3	0.1
HOLMBERG	22	1.3
KILLAM NORTH	15	0.9
KNOPCIK	13	0.9
LAC LA BICHE	4	0.7
LEAHURST	32	1.5
LEGAL	2	1.0
LINDBERGH	11	0.8
LLOYDMINSTER	3	0.5
MURIEL LAKE	5	0.4
NORMANDVILLE	24	4.6
OBERLIN	1	1.0
REDLAND	17	0.6
RYCROFT	9	1.3
SADDLE HILLS	52	5.4
ST. PAUL	1	0.8
STRATHMORE	9	2.4
TUTTLE	3	2.2
WATTS	2	0.9

TABLE C-1 (continued)

FIELD	MARKETABLE GAS AT MAY 31, 1967 Bcf	RESERVE-DELIVERY RATIO Bcf/MMcfd
Small Reserves Plus Reserves Supplying Small Utilities (Continued)		
Whitelaw	18	2.9
Wildmere	17	0.9
Willingdon	14	0.7
Wizard Lake	1	0.5
Woking	4	0.9
TOTAL	489	
		0.8
TOTAL RESERVES CONNECTED AND SUPPLYING REQUIREMENTS	6489	
WEIGHTED AVERAGE RESERVE-DELIVERY RATIO		2.5

TABLE C-2

SUMMARY OF RESERVES AND AVERAGE RESERVE-DELIVERY RATIO FOR ALL RESERVES IN THE PROVINCE

FIELD	MARKETABLE RESERVES AT MAY 31, 1967 BCF	RESERVE-DELIVERY (1) RATIO BCF/MMCFD
RESERVES NOW SUPPLYING ALBERTA'S REQUIREMENTS (SEE TABLE C-1)	6459	2.5
FIELDS INCLUDED IN PERMITS (SEE TABLE C-3)	25910	1.8
FIELDS APPLIED FOR BY TRANS-CANADA PIPE LINES LIMITED (SEE TABLE D-1)	1091	3.5
REMAINING ESTABLISHED RESERVES (2)	8443	1.9
TOTAL RECOVERABLE RESERVES IN THE PROVINCE	41903	
WEIGHTED AVERAGE RESERVE-DELIVERY RATIO		1.9

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(1) THE INITIAL GAS IN PLACE ADJUSTED FOR SURFACE LOSSES DIVIDED BY THE INITIAL FULLY DEVELOPED MARKETABLE GAS DELIVERABILITY.

(2) INCLUDES DEFERRED RESERVES AND RESERVES NOW CONSIDERED BEYOND ECONOMIC REACH.

TABLE C-3

MARKETABLE RESERVES AVAILABLE IN THE FIELDS INCLUDED IN PERMITS AND RESERVE-DELIVERY RATIOS

(ALL VOLUMES AT 1000 BTU PER CUBIC FOOT)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO (1) BCF/MMCFD
ALBERTA AND SOUTHERN GAS CO. LTD. (PERMIT NO. AS 64-3)		
BIGSTONE	326	3.3
BRAZEAU RIVER	150	6.6
CAROLINE	46	1.0
CARSON CREEK	253	0.8
CARSON CREEK NORTH	178	24.2
CROSSFIELD	995	2.0
FERRIER	16	7.5
HARMATTAN-ELKTON	186	2.1
HOMEGLEN-RIMBEY	159	0.7
JUDY CREEK, SWAN HILLS, SWAN HILLS SOUTH AND VIRGINIA HILLS (2)	170	39.8
KAYBOB	491	1.9
MARLBORO	41	5.1
MINNEHIG-BUCK LAKE	431	1.4
PEMBINA	106	4.6
PINE CREEK	152	1.4
PINE NORTH-WEST	168	4.1
SUNDRE	40	10.5
SYLVAN LAKE	7	2.3
WATERTON	1305	2.6
WESTEROSE SOUTH	448	0.5
WESTWARD HO (3)	-	-
WILDCAT HILLS	488	6.6
WILLESDEN GREEN	130	13.1
WILSON CREEK	54	2.5
WINDFALL	522	1.0
TOTAL	6862	
WEIGHTED AVERAGE		1.7

(1) THE INITIAL GAS IN PLACE ADJUSTED FOR SURFACE LOSSES DIVIDED BY THE INITIAL FULLY DEVELOPED MARKETABLE GAS DELIVERABILITY.

(2) GAS SURPLUS TO ALBERTA REQUIREMENTS UP TO A MAXIMUM OF 170 BCF MAY BE REMOVED FROM ALBERTA.

(3) MARGINAL SOLUTION GAS NOT PRESENTLY BEING CONSERVED.

TABLE C-3 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
ALBERTA AND SOUTHERN GAS CO. LTD. (PERMIT NO. AS 67-4)		
BELLOY	78	2.8
BERLAND RIVER	300	1.2
EAGLESHAM	62	4.6
FOX CREEK	118	1.9
GOLD CREEK	100	4.2
HUNTER VALLEY	54	4.8
KAYBOB SOUTH	369	2.8
PEMBINA	8	2.0
TANGENT	116	3.9
WASKAHIGAN	55	2.2
WILDHORSE CREEK	94	8.3
TOTAL	1354	
WEIGHTED AVERAGE		1.4
CANADIAN-MONTANA PIPELINE COMPANY (PERMIT NOS. CM 54-1 AND CM 61-2)		
ADEN	13	1.8
BLACK BUTTE	46	3.0
COMREY	13	1.6
KNAPPEN	19	2.0
MANYBERRIES	5	1.1
PAKOWKI LAKE	3	1.1
PENDANT D'OREILLE	100	1.7
SMITH COULEE	37	2.3
TOTAL	236	
WEIGHTED AVERAGE		1.9
TRANS-CANADA PIPE LINES LIMITED (PERMIT NO. TC 64-6)		
ABEE	8	2.7
ALDERSON	321	4.7
ATLEE-BUFFALO	131	3.5
BAPTISTE	12	0.7
BASHAW	36	0.3
BELLIS	41	0.9
BINDLOSS	279	3.4

TABLE C-3 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
TRANS-CANADA PIPE LINES LIMITED (CONT'D)		
BOYLE	11	0.8
CALLING LAKE	37	1.5
CAROLINE	143	4.0
CARSTAIRS	772	1.7
CESSFORD	1079	2.2
CHIGWELL	54	2.1
CONNORSVILLE	63	3.3
COUNTESS	145	0.7
CRAIGEND	180	1.7
CROSSFIELD	420	4.3
CROSSFIELD EAST	832	5.0
DRUMHELLER	52	1.2
EDSON	1995	1.9
ENCHANT	36	0.3
EQUITY	25	2.4
ERSKINE	41	1.5
FENN-BIG VALLEY (1)	-	-
FENN WEST	7	0.5
FIGURE LAKE	33	0.9
FRANCIS	5	5.3
GARRINGTON	43	2.8
GHOST PINE	282	1.6
GILBY	688	1.7
HACKETT	50	1.4
HAMILTON LAKE	-	-
HARMATTAN EAST	78	7.8
HARMATTAN-ELKTON	40	0.8
HOMEGLEN-RIMBEY	479	0.5
HUSSAR	382	0.7
INNISFAIL	83	6.1
LITTLE BOW	16	0.5

(1) SOLUTION GAS RESERVES WHICH ARE NOT SURPLUS TO ALBERTA REQUIREMENTS AT PRESENT RATE OF PRODUCTION.

TABLE C-3 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
TRANS-CANADA PIPE LINES LIMITED (CONT'D		
LONE PINE CREEK	242	2.4
LONG COULEE	14	0.3
MALMO	32	0.8
MARTEN HILLS	688	2.2
MEDICINE HAT	281	5.2
MEDICINE RIVER	270	4.0
MINNEHIK-BUCK LAKE (1)	-	-
NEVIS	723	1.9
OLDS	321	2.9
OYEN	35	3.2
PINCHER CREEK	318	12.8
PREVO	35	3.6
PRINCESS	125	2.0
PROVOST	633	1.7
RETLAW	54	1.7
RICH	12	1.2
ROWLEY	71	2.7
SEDALIA	97	10.8
SEIU LAKE	27	6.0
SIBBALD	24	2.5
STANDARD	20	5.4
STETTLER (2)	-	-
SUNDRE	17	4.2
SUNNYNOOK	30	2.9
SWALWELL	42	4.8
SYLVAN LAKE	476	2.4
THORHILD	10	2.3
THREE HILLS CREEK	191	3.8
TROCHU	5	3.5
TWINING NORTH	48	4.4
VERGER	68	1.0
VULCAN	35	1.7
WAYNE-ROSEDALE	199	1.1

(1) ALBERTA AND SOUTHERN HAS FIRST CALL ON DELIVERABILITY.

(2) SOLUTION GAS RESERVES WHICH ARE NOT SURPLUS TO ALBERTA REQUIREMENTS AT PRESENT RATES OF PRODUCTION.

TABLE C-3 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
TRANS-CANADA PIPE LINES LIMITED (CONT'D)		
WESTEROSE	84	22.0
WESTEROSE SOUTH	554	0.6
WIMBORNE	228	1.1
WINTERING HILLS	68	2.5
WOOD RIVER	28	1.9
TOTAL	15004	
WEIGHTED AVERAGE		1.7
WESTCOAST TRANSMISSION COMPANY LIMITED (PERMIT NO. WC 59-3)		
CROSSFIELD	1238	3.7
SAVANNA CREEK	179	13.5
TOTAL	1417	
WEIGHTED AVERAGE		4.1
WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD. (PERMIT NOS. WC 52-1 AND WC 62-5)		
BRAEBURN	62	3.9
GORDONDALE	18	1.6
POUCE COUPE	25	2.0
POUCE COUPE SOUTH	35	1.3
WORSLEY	9	0.4
TOTAL	149	
WEIGHTED AVERAGE		1.2
WESTCOAST TRANSMISSION COMPANY LIMITED AND WESTCOAST TRANSMISSION COMPANY (ALBERTA) LTD. (PERMIT NO. WC 61-4)		
BOUNDARY LAKE SOUTH	38	0.9
OTHERS		
ANTELOPE	19	1.0
ESTHER	32	0.9

TABLE C-3 (CONTINUED)

FIELD	MARKETABLE GAS AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO BCF/MMCFD
OTHERS (CONT'D)		
HALLIDAY	4	1.4
MEDICINE HAT	750	2.3
RED COULEE	5	3.3
RICHDALE	18	1.8
WILDUNN CREEK	22	3.1
TOTAL	850	
WEIGHTED AVERAGE		2.1
TOTAL (ALL FIELDS)	25910	
WEIGHTED AVERAGE (ALL FIELDS)		1.8

TABLE C-4

RESERVES REQUIRED TO MEET PRESENT PERMIT COMMITMENTS[1]

(ALL VOLUMES AT 1000 BTU PER CUBIC FOOT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	REMAINING PERMIT COMMITMENT									EXCESS IN PERMIT FIELDS	
PERMITTEE	TOTAL BCF	MAXIMUM DAY MMCF	TERMINAL DATE OF PERMIT	RESERVES IN PERMIT FIELDS BCF	RESERVE-DELIVERY RATIO OF PERMIT FIELDS BCF/MMCFD	COMPOSITE CORRECTION FACTOR	MARKETABLE GAS IN PLACE REQUIRED TO MEET TERMINAL PEAK DAY BCF	MARKETABLE GAS REQUIRED TO MEET TERMINAL PEAK DAY BCF	TOTAL MARKETABLE GAS TO MEET PERMIT COMMITMENT BCF	BEFORE TERMINAL DATE BCF	AFTER TERMINAL DATE BCF
ALBERTA AND SOUTHERN GAS CO. LTD. (AS 64-3)	6482	936	31/10/91	6862	-	-	-	-	6482	380	380
ALBERTA AND SOUTHERN GAS CO. LTD (AS 67-4)	1284	160	31/10/93	1354	-	-	-	-	1284	70	70
CANADIAN-MONTANA PIPE-LINE COMPANY	236	98	14/3/86	236	-	-	-	-	236	-	-
TRANS-CANADA PIPE LINES LIMITED	13631	2135	31/10/90	15004[2]	-	-	-	-	13631	1373	1373
WESTCOAST TRANSMISSION COMPANY LIMITED (SOUTHERN ALBERTA)	924	177	29/2/84	1417[2]	4.1	1.5	1089	787	1711	-294	493
WESTCOAST TRANSMISSION COMPANY LIMITED (PEACE RIVER)	187	183	31/12/79	187	-	-	-	-	187	-	-
OTHERS	706	188		850	-	-	-	24	730	120	144
TOTALS	23450	3877		25910				811	24261	1649	2460
ROUNDED TOTALS	23500	3900		25900				800	24300	1600	2400

(1) ALL FIGURES ARE AS OF MAY 31, 1967.

(2) TRANS-CANADA DELIVERIES (CONTRACT VOLUME 300 BCF) FROM THE CROSSFIELD RUNDLE B AND WABUMUN A POOLS ARE DEPENDENT ON DELIVERABILITY SURPLUS TO THAT REQUIRED BY WESTCOAST IN THE SAME POOLS.

TABLE C-5

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS AS OF DECEMBER 31, 1966 AS ESTIMATED BY TRANS-CANADA

(ALL VOLUMES IN TRILLIONS OF CUBIC FEET AT 1000 BTU PER CUBIC FOOT)

CONTRACTABLE RESERVES				
NOW CONSIDERED WITHIN ECONOMIC REACH		39.3		
LESS: DEFERRED		4.5		
TOTAL CONTRACTABLE RESERVES			34.8	
CONTRACTABLE REQUIREMENTS				
CONTRACTABLE ALBERTA REQUIREMENTS		6.4		
PERMIT REQUIREMENTS -				
TO MEET COMMITMENTS	23.6			
TO MEET TERMINAL YEAR PEAK	0.8			
		24.4		
TOTAL CONTRACTABLE REQUIREMENTS			30.8	
CONTRACTABLE SURPLUS				+4.0
REMAINING REQUIREMENTS				
TOTAL ALBERTA REQUIREMENTS FOR DELIVERY	12.4			
ALBERTA REQUIREMENTS FOR THIRTIETH YEAR PEAK	6.3			
TOTAL ALBERTA REQUIREMENTS		18.7		
LESS: AVAILABLE FROM CONTRACTABLE RESERVES		6.4		
TOTAL REMAINING REQUIREMENTS			12.3	
REMAINING AND FUTURE RESERVES				
FROM DEFERRED GAS AVAILABLE WITHIN THE 30 YEAR PERIOD		3.8		
FROM RELEASE OF RESERVES REQUIRED TO PROTECT PEAK DAY IN PERMITS		0.8		
FROM RESERVES WHICH WILL BECOME WITHIN ECONOMIC REACH DURING THE 30 YEAR PERIOD		1.8		
FROM APPRECIATION OF ESTABLISHED RESERVES AND FUTURE DISCOVERIES		5.2		
			11.6	
FUTURE DEFICIENCY				-0.7
OVERALL SURPLUS				+3.3

TABLE C-6

CPA PROBABLE MARKETABLE GAS RESERVES

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS AS OF DECEMBER 31, 1966

(All Volumes in Trillions of Cubic Feet at 1000 BTU Per Cubic Foot)

Contractable Reserves				
Now Considered within economic reach		39.8		
Empress Plant shrinkage		0.3		
Less deferred		4.5		
Total contractable reserves			35.6	
Contractable Requirements				
Contractable Alberta requirements		6.4		
Permit requirements -				
to meet commitments	23.6			
to meet terminal year peak	0.8			
		24.4		
Total contractable requirements			30.8	
CONTRACTABLE SURPLUS				+4.8
Remaining Requirements				
Total Alberta requirements for delivery	12.4			
Alberta requirements for thirtieth year peak	6.3			
Total Alberta requirements		18.7		
Less: available from contractable reserves		6.4		
Total remaining requirements			12.3	
Remaining and Future Reserves				
From deferred gas available within 30 years		3.8		
From reserves now considered beyond economic reach		1.8		
From 2 years trends		5.7		
Total remaining and future reserves			11.3	
FUTURE SURPLUS				-1.0
Overall Surplus				
Before release of reserves required to protect peakday in permits				+3.8
After release of reserves required to protect peakday in permits				+4.6

TABLE C-7

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS

AS OF MAY 31, 1967

AS ESTIMATED BY THE BOARD

(All Volumes In Trillions Of Cubic Feet At 1000 Btu Per Cubic Foot)

CONTRACTABLE RESERVES				
Now Considered Within Economic Reach		39.0		
Less: Deferred		4.9		
Total Contractable Reserves			34.1	
CONTRACTABLE REQUIREMENTS				
Contractable Alberta Requirements		6.5		
Permit Requirements - To Meet Commitments	23.5			
- To Meet Terminal Year Peak Day	0.8			
Total Contractable Requirements			30.8	
CONTRACTABLE SURPLUS				3.3
REMAINING REQUIREMENTS				
Total Alberta Requirements For Delivery	12.4			
Less: Deliveries From Contractable Reserves	4.9			
Deliveries Required From Other Sources		7.5		
Total Alberta Requirements For Thirtieth Year Peak Day	5.2			
Less: Available From Contractable Reserves	1.6			
Required From Other Sources To Meet Thirtieth Year Peak Day		3.6		
Total Remaining Requirements			11.1	
REMAINING AND FUTURE RESERVES				
From Deferred Gas Available Within 30 Years		4.3		
From Reserves Now Considered Beyond Economic Reach		1.8		
From 2 Years Trends		5.0		
Total Remaining And Future Reserves			11.1	
FUTURE SURPLUS				0.0
OVERALL SURPLUS				
Before Release Of Reserves Required To Protect Peak Day In Permits				3.3
After Release Of Reserves Required To Protect Peak Day In Permits				4.1

TABLE C-8

DEFERRED GAS RESERVES

(All Volumes At 1000 Btu Per Cubic Foot)

POOL	MARKETABLE RESERVE AT MAY 31, 1967 Bcf	
Marketable Within 30 Years		
Bantry Mannville A	31	
Ferrier Cardium E	300	
Gold Creek Wabumun A	262	
Harmattan East Rundle	1,061	
Harmattan-Elkton Rundle A	1,074	
Joarcam Viking	52	
Kaybob Cadomin B	65	
Kaybob South Beaverhill Lake A	206	
Leduc-Woodbend D-2 A	46	
Leduc-Woodbend D-3 A	385	
Pembina Cardium	200	
Sylvan Lake Jurassic	32	
Windfall D-3 A (Includes Injected Pine Creek D-3 and Wabumun Gas)	310	
Other Minor Reserves	285	
		4,309
Deferred Beyond 30 Years		
Bonnie Glen D-3 A	378	
Golden Spike D-3 A	129	
Westerose D-3	100	
		607
Total Deferred Reserves		4,916

APPENDIX D

THE APPLICATIONS FOR AUTHORIZATION FOR THE REMOVAL OF ADDITIONAL QUANTITIES OF GAS AND THE EFFECT THE AUTHORIZATION WOULD HAVE ON SURPLUS

Trans-Canada is now authorized under its permit to remove from the Province 15,000 billion cubic feet of gas, of which some 2,260 billion cubic feet had been removed to May 31, 1967. It applied for an increase of 2,100 billion cubic feet in the quantity authorized, which would increase the total to 17,100 billion cubic feet of gas, at a maximum daily rate of 2,170 million cubic feet, from the fields now named in its permit and from eleven new fields and areas. The volumes before and after adjustment to the basis of 1,000 Btu per cubic foot are compared below:

	As is Basis	1,000 Btu Basis
Total Trans-Canada permit volume, May 31, 1967, Bcf	15,000	16,050
Addition applied for, Bcf	2,100	2,247
Trans-Canada permit volume if the application is granted, Bcf	17,100	18,297
Removed at May 31, 1967, Bcf	2,260	2,418
Remaining Trans-Canada permit volumes if the application is granted, Bcf	14,840	15,879
Present maximum daily rate, MMcfd	1,995	2,135
Maximum daily rate applied for, MMcfd	2,170	2,322

All volumes subsequently referred to in this Appendix respecting the Trans-Canada permit are on the basis of 1,000 Btu per cubic foot.

Trans-Canada has applied for an increase of its remaining authorized withdrawals from 13,632 as of May 31, 1967, to 15,879 billion cubic feet (16,050 - 2,418 = 13,632).

Alberta and Southern is now authorized under Permit No. AS 64-3 to remove from the Province 6,930 billion cubic feet of gas, of which some 870 billion cubic feet had been removed to May 31, 1967. It applied for an increase of 160 billion cubic feet in the quantity authorized, which would increase the total to 7,090 billion cubic feet of gas, at a maximum daily rate of 900 million cubic feet, from the fields now included in its permit. The volumes before and after adjustment to the basis of 1,000 Btu per cubic foot are compared below:

	As is Basis	1,000 Btu Basis
Total Alberta and Southern permit volume, May 31, 1967, Bcf	6,930	7,415
Addition applied for, Bcf	160	171
Alberta and Southern permit volumes if the application is granted, Bcf	7,090	7,586
Removed at May 31, 1967	870	931
Remaining Alberta and Southern permit volumes if the application is granted, Bcf	6,220	6,655
Present maximum daily rate, MMcfd	875	936
Maximum daily rate applied for, MMcfd	900	963

All volumes subsequently referred to in this Appendix respecting this permit are on the basis of 1,000 Btu per cubic foot.

Alberta and Southern has in effect applied for an increase of its remaining authorized withdrawals under Permit No. AS 64-3 from 6,484 as of May 31, 1967, to 6,655 billion cubic feet (7,415 - 931 = 6,484).

Alberta and Southern did not apply for authority to remove gas from the Province from any new pools, fields or areas. Table D-1 lists the new fields which Trans-Canada applied to have added to its permit. The table also shows the Board's current estimate of the remaining reserves of marketable gas and the reserve-delivery ratio for each of these fields. One of the fields from which Trans-Canada proposes to remove part of the gas reserves is the Brazeau River Field where Alberta and Southern already has approval to remove some gas reserves.

The results of the Board's analysis with respect to the meeting of permit commitments and the additional volumes applied for by Trans-Canada and Alberta and Southern are presented in Table D-2, which is identical in form to the previously discussed Table C-4. In fact the only changes have been to replace the Trans-Canada entry and the Alberta and Southern AS 64-3 entry with new entries reflecting the additional quantities applied for and reserves available in the fields from which the applicants propose to remove gas.

The Trans-Canada entry in the same table suggests that the remaining volume applied for of 15,879 billion cubic feet is less than the Board's estimate of total reserves of fields which would be included in Trans-Canada's permit of 16,095 billion cubic feet. Westcoast has first right to deliverability from the Crossfield pools being processed at the Petrogas Processing Ltd. facility for the duration of its contract, but Trans-Canada has under contract any additional volumes, up to a maximum of 300 billion cubic feet, available after satisfying the Westcoast permit. This gas will likely be partly available during the term of the Westcoast contract and if not would certainly be available following termination of the Westcoast contract; hence, this 300 billion cubic feet has been included in Column 4 of Table D-2 as reserves in permit fields available to Trans-Canada.

It may be seen from the Alberta and Southern AS 64-3 entry in Table D-2 that the remaining volume applied for of 6,655 billion cubic feet is somewhat less than the Board's estimate of total reserves available from fields included in Alberta and Southern's permit of some 6,862 billion cubic feet.

The Board is of the opinion that, if Alberta's requirements and the other permit volumes can be separately accommodated from remaining Alberta reserves, the entire amounts applied for may be included in the quantity approved for removal from the Province. However, no assurance can be given that the gas can be produced during the full term of the permits at the respective requested maximum daily rates.

Table D-2 further shows that, with the inclusion of the volumes applied for by Trans-Canada and Alberta and Southern, the remaining permit commitments would total some 25.9 trillion cubic feet and the reserves required to meet these commitments would total some 26.7 trillion cubic feet.

Table D-3 presents the calculation of the amount of gas that will be surplus to Alberta's requirements and the permit commitments if the applications of Trans-Canada and Alberta and Southern are granted. Most of the figures used in the preparation of the table have been taken directly from Table C-7.

On the basis of the Board's estimates, the contractable surplus would be 0.9 trillion cubic feet, as shown in Table D-3, if Trans-Canada and Alberta and Southern are authorized to remove the additional volumes applied for. The table also shows that the remaining and future reserves would just balance the remaining requirements. Since there would not be a future surplus, the contractable surplus would equal the overall surplus before release of reserves allocated to protect peak day requirements in permits. After release, at the end of the term of the permits, of the 0.8 trillion cubic feet of gas allocated to protect peak day requirements in permits, an overall surplus of 1.7 trillion cubic feet would exist.

TABLE D-1

MARKETABLE RESERVES IN FIELDS APPLIED FOR BY TRANS-CANADA

(ALL VOLUMES AT 1000 BTU PER CUBIC FOOT)

FIELD	MARKETABLE RESERVES AT MAY 31, 1967 BCF	RESERVE-DELIVERY RATIO (1) BCF/MMCFD
BERRY CREEK	11	2.5
BRAZEAU RIVER	463	5.4
BRUCE	20	1.3
FISH LAKE	8	6.7
FLAT LAKE	58	2.2
HAMILTON LAKE NORTH	6	6.7
JARROW	8	1.8
KILLAM	28	0.6
LOOKOUT BUTTE	468	4.2
MALMO	10	3.3
NEW NORWAY	11	1.4
TOTAL	1,091	
WEIGHTED AVERAGE		3.5

(1) THE INITIAL GAS IN PLACE ADJUSTED FOR SURFACE LOSSES DIVIDED BY THE INITIAL FULLY DEVELOPED MARKETABLE GAS DELIVERABILITY.

TABLE D-2

RESERVES REQUIRED TO MEET PRESENT PERMIT COMMITMENTS INCLUDING
ALBERTA AND SOUTHERN AND TRANS-CANADA APPLICATIONS (1)

(ALL VOLUMES AT 1000 BTU PER CUBIC FOOT)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	REMAINING PERMIT COMMITMENT									EXCESS GAS IN PERMIT FIELDS	
PERMITTEE	TOTAL BCF	MAXIMUM DAY MMCF	TERMINAL DATE OF PERMIT	RESERVES IN PERMIT FIELDS BCF	RESERVE-DELIVERY RATIO OF PERMIT FIELDS BCF/MMCFD	COMPOSITE CORRECTION FACTOR	MARKETABLE GAS IN PLACE REQUIRED TO MEET TERMINAL PEAK DAY BCF	MARKETABLE GAS REQUIRED TO MEET TERMINAL PEAK DAY BCF	TOTAL MARKETABLE GAS TO MEET PERMIT COMMITMENT BCF	BEFORE TERMINAL DATE BCF	AFTER TERMINAL DATE BCF
ALBERTA AND SOUTHERN GAS CO. LTD. (AS 64-3)	6655	963	31/10/91	6862	-	-	-	-	6655	207	207
ALBERTA AND SOUTHERN GAS CO. LTD. (AS 67-4)	1284	160	31/10/93	1354	-	-	-	-	1284	70	70
CANADIAN-MONTANA PIPELINE COMPANY	236	98	14/ 3/86	236	-	-	-	-	236	-	-
TRANS-CANADA PIPE LINES LIMITED	15879	2322	31/10/92	16095 (2)	-	-	-	-	15879	216	216
WESTCOAST TRANSMISSION COMPANY LIMITED (SOUTHERN ALBERTA)	924	177	29/ 2/84	1417 (2)	4.1	1.5	1089	787	1711	-294	493
WESTCOAST TRANSMISSION COMPANY LIMITED (PEACE RIVER)	187	183	31/12/79	187	-	-	-	-	187	-	-
OTHERS	706	188		850	-	-	-	24	730	120	144
TOTALS	25871	4091		27001				811	26682	319	1130
ROUNDED TOTALS	25900	4100		27000				800	26700	300	1100

(1) ALL VOLUMES ARE AS OF MAY 31, 1967, EXCEPT FOR THE ADJUSTMENTS FOR THE ALBERTA AND SOUTHERN AND TRANS-CANADA APPLICATIONS.

(2) TRANS-CANADA DELIVERIES (CONTRACT VOLUME 300 BCF) FROM THE CROSSFIELD RUNDLE B AND WABUMUN A POOLS ARE DEPENDENT ON DELIVERABILITY SURPLUS TO THAT REQUIRED BY WESTCOAST IN THE SAME POOLS.

TABLE D-3

GAS SURPLUS TO ALBERTA'S REQUIREMENTS AND PERMIT COMMITMENTS AS OF MAY 31, 1967 IF ALBERTA AND SOUTHERN AND TRANS-CANADA APPLICATIONS ARE GRANTED

(All Volumes In Trillions Of Cubic Feet At 1000 Btu Per Cubic Foot)

CONTRACTABLE RESERVES					
Now Considered Within Economic Reach			39.0		
Less Deferred			4.9		
Total Contractable Reserves				34.1	
CONTRACTABLE REQUIREMENTS					
Contractable Alberta Requirements			6.5		
Permit Requirements - To Meet Commitments		25.9			
- To Meet Terminal Year Peak Day		0.8			
Total Contractable Requirements			33.2		
CONTRACTABLE SURPLUS					0.9
REMAINING REQUIREMENTS					
Total Alberta Requirements For Delivery	12.4				
Less Deliveries From Contractable Reserves	4.9				
Deliveries Required From Other Sources		7.5			
Total Alberta Requirements For Thirtieth Year Peak Day	5.2				
Less: Available From Contractable Reserves	1.6				
Required From Other Sources To Meet Thirtieth Year Peak Day		3.6			
Total Remaining Requirements			11.1		
REMAINING AND FUTURE RESERVES					
From Deferred Gas Available Within 30 Years		4.3			
From Reserves Now Considered Beyond Economic Reach		1.8			
From 2 Years Trends		5.0			
Total Reamining And Future Reserves			11.1		
FUTURE SURPLUS					0.0
OVERALL SURPLUS					
Before Release Of Reserves Required To Protect Peak Day In Permits					0.9
After Release Of Reserves Required To Protect Peak Day In Permits					1.7

APPENDIX E

IN THE MATTER of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956; and

IN THE MATTER of a Permit to Trans-Canada Pipe Lines Limited authorizing the removal of gas from the Province.

PERMIT No. TC 67-7

WHEREAS Trans-Canada Pipe Lines Limited (herein called "the Permittee") is removing gas from the Province under the authority of Permit No. TC 64-6; and

WHEREAS the Permittee has applied to the Oil and Gas Conservation Board for an increase in the volumes of gas that it may remove or cause to be removed from the Province, and for amendment and consolidation of its permit; and

WHEREAS the Board upon inquiry into and hearing of the application has found that the Permittee is a person who appears to have made arrangements to purchase gas within the Province and who proposes to remove such gas from the Province and that the provisions of The Gas Resources Preservation Act, 1956, affecting the application have been complied with; and

WHEREAS the Board is of the opinion that the granting of this Permit for the removal of gas from the Province is in the public interest having regard to the present and future needs of persons within the Province and to the established reserves and the trends in growth and discovery of reserves of gas in the Province; and

WHEREAS the Lieutenant Governor in Council has given his approval by Order in Council, numbered O.C. /67, and dated

THEREFORE, the Oil and Gas Conservation Board, pursuant to the provisions of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956, hereby grants a permit to Trans-Canada Pipe Lines Limited, and hereby authorizes the removal of gas from the Province, subject to the regulations and orders made pursuant to the provisions of the said Act and to the terms and conditions prescribed in this Permit as follows:

1. Subject to the conformity by the Permittee with the terms and conditions hereof, this Permit shall be operative for a term commencing on the date hereof and ending on October 31, 1992.

2. The quantity of gas that may be removed from the Province pursuant to this Permit shall not exceed

   (a) during the term of the Permit and together with gas removed under Permit No. TC 54-1, Permit No. TC 59-2, Permit No. TC 60-3, Permit No. TC 60-4, Permit No. TC 64-5, and Permit No. TC 64-6, 17,100,000,000,000 cubic feet, nor

   (b) during any consecutive 24-hour period or any consecutive 12-month period ending October 31, rates limited by field productivity and good engineering practice, but in a 24-hour period such rates shall not exceed 2,170,000,000 cubic feet and in a 12-month period such rates shall not exceed 720,000,000,000 cubic feet.

3. The quantity of gas that may be removed from the Province, in accordance with clause 2, subclause (b), during any 12-month period ending October 31, may be augmented by any part of the quantity by which gas removed from the Province under this Permit, Permit No. TC 54-1, Permit No. TC 59-2, Permit No. TC 60-3, Permit No. TC 60-4, Permit No. TC 64-5 or Permit No. TC 64-6, in the last preceding four-year period ending October 31, shall have been less than the quantity authorized by the permit or permits to be so removed in the four-year period and which has not, in the meantime, been removed from the Province as an augmentation authorized by this clause, but nothing herein authorizes the removal of gas from the Province in any consecutive 24-hour period or during the term of the Permit in excess of the volumes stipulated for such periods in clause 2.

4. Notwithstanding the provisions of clause 2, subclause (b), the Permittee, for the purpose only of alleviating temporary operating problems caused by pipe line or equipment failure, may remove in any consecutive 24-hour period 110 per cent of the volume of gas authorized by said subclause (b).

5. The Permittee, for the purpose of this Permit, may purchase or otherwise acquire for removal from the Province, and subject to clause 7 there may be removed from the Province under the

authority of this Permit, only gas produced from the following pools, fields and areas:

Abee Field

Alderson 2 WS A Pool

Alderson Bow Island A Pool

Atlee-Buffalo Field

Baptiste Field

Bashaw Field

Bellis Field

Berry Creek Field

Bindloss Field

Boyle Field

Brazeau River Field

Bruce Field

Calling Lake Field

Caroline Viking A Pool

Caroline Viking E Pool

Caroline Basal Mannville A Pool

Carstairs Field

Cessford Field

Chigwell Field

Connorsville Field

Countess Field

Craigend Field

Crossfield Field

Crossfield East Field

Drumheller Field

Edson Field

Enchant Field

Equity Field

Erskine Field

Fenn-Big Valley Field

Fenn West Field

Figure Lake Field

Flat Lake Field

Francis Field

Garrington Mannville A Pool

Garrington Leduc A Pool

Ghost Pine Field

Gilby Field

Hackett Field

Hamilton Lake Field

Hamilton Lake North Field

Harmattan East Field

Harmattan-Elkton Rundle A Pool

Homeglen-Rimbey Field

Hussar Field

Innisfail Field

Jarrow Field

Killam Field

Little Bow Field

Lone Pine Creek Field

Long Coulee Field

Lookout Butte Field

Malmo Field

Marten Hills Field

Medicine River Field

Minnehik-Buck Lake Field

Nevis Field

New Norway Field

Olds Field

Oyen Field

Pincher Creek Field

Prevo Field

Princess Field

Provost Field

Retlaw Field

Rich Field

Rowley Field

Sedalia Field

Seiu Lake Field

Sibbald Field

Standard Field

Stettler Field

Sundre Basal Mannville A Pool

Sundre Basal Mannville B Pool

Sunnynook Field

Swalwell Field

Sylvan Lake Field

Thorhild Field

Three Hills Creek Field

Trochu Field

Twining North Field

Verger Field

Vulcan Field

Wayne-Rosedale Field

Westerose Field

Westerose South Field

Wimborne Field

Wintering Hills Field

Wood River Field

The area in the Medicine Hat Field being north of Sections 1 to 6 inclusive, in Township 15, and in Ranges 1 to 3 inclusive, West of the 4th Meridian, excepting therefrom Section 7, Township 15, Range 2, West of the 4th Meridian.

6. (1) The Permittee shall satisfy the Board prior to November 1, 1970, or such later date as the Board upon application by the Permittee may stipulate, that

(a) the Permittee has entered into gas purchase contracts to purchase gas from the Bruce Field, the Flat Lake Field, the Jarrow Field and the Killam Field or from a substantial part of each of the fields; and

(b) the Permittee has elected to cause the construction of the Bruce-Birch Lake Line or has advised the sellers under the contracts referred to in subclause (a) that it is proceeding to cause the Marten Hills Line to be constructed; and

(c) arrangements have been completed for construction of facilities necessary for the transportation of gas produced from the said fields and that effective removal of gas produced from the said fields shall commence on or before February 1, 1971, unless upon application by the Permittee a later date is stipulated by the Board.

(2) If the Permittee fails to satisfy the Board at the time and regarding the matters set out in subclause (1), the Board may, at a public hearing, reconsider the circumstances and may delete from this Permit any or all of the fields referred to in subclause (1) and reduce the volumes referred to in clause 2 accordingly.

7. Gas acquired in Alberta by the Permittee, in exchange for equal volumes of gas, adjusted for any difference in higher heating value, produced from pools, fields or areas named in clause 5, may be removed from the Province under the authority of this Permit.

8. The Permittee shall remove or cause to be removed pursuant to this Permit only such gas as is delivered to it through facilities of The Alberta Gas Trunk Line Company Limited at the interconnections of their pipe lines in the North-east quarter of

Section 11, Township 20, Range 1, West of the 4th Meridian and in the North-east quarter of Section 11, Township 38, Range 1, West of the 4th Meridian.

9. (1) All gas removed from the Province pursuant to this Permit shall be measured by or on behalf of the Permittee by master meters approved by the Board and located at the points at which gas is delivered in accordance with clause 8 by The Alberta Gas Trunk Line Company Limited to the Permittee.

(2) The specific gravity and higher heating value of all gas received by the Permittee through the facilities of The Alberta Gas Trunk Line Company Limited shall be measured by or on behalf of the Permittee at the points at which gas is delivered by The Alberta Gas Trunk Line Company Limited to the Permittee.

(3) The measurements required by this clause shall be made in a manner approved by the Board and shall be reported monthly in a manner approved by the Board.

10. Subject to section 14 of the said Act, all quantities of gas for the purpose of this Permit shall be referred to a 14.65 pounds per square inch absolute pressure base and a 60 degree Fahrenheit temperature base.

11. Notwithstanding the provisions of any contract for the purchase or other acquisition of gas, the Board may require the extraction of any substance or substances except methane from any gas before its removal from the Province pursuant to this Permit.

12. The Permittee will supply gas from the pipe line of The

Alberta Gas Trunk Line Company Limited at a reasonable price to any community or consumer within the Province, or to any public utility requiring gas for such a community or consumer, that is willing to take delivery of gas at a point on the pipe line, and that, in the opinion of the Board, can reasonably be so supplied by the Permittee.

13. If any community, consumer or public utility is willing to take delivery of gas pursuant to clause 12, and agreement on the price to be paid for the gas cannot be reached, the price to be paid shall be determined by the Public Utilities Board on the application of an interested party, and the part of the price attributable to transportation shall be based on the assumption that the gas has been supplied from the capable source or sources available to the Permittee nearest to the point of delivery.

14. Notwithstanding the provisions hereof, the Permittee shall comply with the provisions of any Act, competent regulation, order or direction governing the drilling for, production, conservation, gathering, transportation, processing, purchasing, acquisition, sale, measurement, reporting, testing, supply or delivery of gas within the Province.

15. Permit No. TC 64-6 is rescinded.

MADE at the City of Calgary, in the Province of Alberta, this day of , A. D. 1967.

OIL AND GAS CONSERVATION BOARD

G. W. Govier

Chairman

APPENDIX F

IN THE MATTER of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956; and

IN THE MATTER of a Permit to Alberta and Southern Gas Co. Ltd. authorizing the removal of gas from the Province.

AMENDMENT OF PERMIT No. AS 64-3

The Oil and Gas Conservation Board, pursuant to section 12 of The Gas Resources Preservation Act, 1956, being chapter 19 of the Statutes of Alberta, 1956, having publicly heard the application of the Permittee for amendment of the Permit, at the City of Calgary, in the Province of Alberta, at a hearing on June 9, 1967, having regard to its own knowledge and responsibility under the Act, and the Lieutenant Governor in Council having given his approval by Order in Council dated and numbered O.C. , hereby orders as follows:

1. Permit No. AS 64-3, dated December 1, 1964, granted under The Gas Resources Preservation Act, 1956, to Alberta and Southern Gas Co. Ltd., is amended.

2. Clause 2 of the terms and conditions of the Permit is amended

   (a) as to subclause (a), by striking out the numeral "6,930,000,000,000" and by substituting the numeral "7,090,000,000,000",

(b) as to subclause (b),

(i) by striking out the numeral "875,000,000" and by substituting the numeral "900,000,000", and

(ii) by striking out the numeral "287,000,000,000" and by substituting the numeral 294,000,000,000".

MADE at the City of Calgary, in the Province of Alberta, this day of A. D. 1967.

OIL AND GAS CONSERVATION BOARD

G. W. Govier

Chairman